Aurora Stormwater Program Master Plan

Gap Analysis Technical Memo

March 2015

FOR:

City of Aurora
15151 E. Alameda Parkway
Aurora, CO

BY:

Calibre Engineering, Inc.
9090 S. Ridgeline Blvd, Suite 105
Highlands Ranch, CO 80129
(303) 730-0434

Table of Contents

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

Gap Analysis Technical Memorandum

1.0 Executive Summary

1.1 Introduction

Purpose:

The Gap Analysis Technical Memorandum ("Gap Analysis" or "Tech Memo") is a tool for the overall Stormwater Program that will help to organize the City's current systems, processes, procedures, etc. so that the City is able to prioritize steps to close the identified gaps and outline a plan to move the Program forward.

The purpose of this Gap Analysis is identify and analyze gaps in the City of Aurora's Stormwater Program. To that end, this Gap Analysis analyzes the individual Program Elements (*outlined in Section 1.4*) of the Aurora Stormwater Program and identifies gaps and overlaps currently existing within and between Program Elements. The list provided herein generally orders gaps such that "higher priorities" (which have high safety consequences or large financial risk implications) are listed first and "lower priorities" (which have less impact on public safety or do not present a large financial risk) are listed later. The resolution and ultimate prioritization of gaps is outside the scope of this document.

This intent of this document is not to provide a detailed account of software or organizational charts, but software and organization are considered in the process.

Summary of Process:

For the purposes of this study, gaps were identified through a process of reviewing existing documents, analyzing previous studies, meeting and conferring with various stakeholders, and developing and completing the Function Matrices (*see Section 1.2 and Appendix A*). Gaps include elements such as: incomplete processes, missing tools or documentation, overlapping processes, misuse of tools or software, lack of staff, lack of funding, etc.

For ease of review, gaps herein have been listed according to a subjective level of approximate priority. Gaps which may have high safety consequences or large financial risk implications are listed first, and gaps with less impact on public safety and low financial risk are listed last. This priority level was determined quantitatively by first considering safety, then financial risk, and, finally, by comparing each gap to the City's Overarching Priorities *(refer to "Overarching Priorities" deliverable)*. In some cases, additional numerical quantification of gaps through a decision-making model such as *Expert Choice* may be warranted. However, further quantification of identified gaps is considered beyond the scope of this deliverable.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

Gaps were reviewed by members of the Technical Advisory Committee (TAC) and modified in accordance with the comments provided by the TAC. More about the process of finding gaps can be found in *Section 2.1 Process of Gap Identification.*

This Aurora Stormwater Management Plan (SWMP) study did not include an "Engineering" Program Element or a "Development Review" Program Element.

Summary of Findings:
Section 1.5 Findings Summary: An At-A-Glance Review provides an "at-a-glance" look at the findings and gaps (for each Program Element) that are explained throughout the course of this report, providing a brief synopsis for a reviewer in need of a quick review.

A path forward evaluation and approach will be presented on a Project Website Deliverable at a later date.

1.2 Function Matrices

To facilitate identification of gaps and overlaps, Function Matrices were developed and have been included for each Program Element (*Appendix A – Function Matrices*). The functions and tasks within the Function Matrices form the benchmarks for the Gap Analysis, and all functions and tasks were reviewed by the Technical Advisory Committee (TAC).

1.3 TAC Committee

The TAC members are listed below:

Technical Advisory Committee	
Name	**Role**
Sarah Young	Aurora PM
Jon Villines	Aurora Assist. PM
Dan Mikesell	TAC Deputy Director of Operations and Engineering
Bill McCormick	TAC Associate City Engineer
Joe McCleary	TAC Stormwater Superintendent
Clinton Weisz	TAC Assistant Water CIP Manager
Sean Lieske	TAC Environmental Permitting Manager
Thomas Ries	TAC Manager of Water Operations & Maintenance
Cliff Stephens	TAC Manager of Water Engineering (Interim)
Jo Ann Giddings	TAC Water Financial Administrator
Tracy Young	TAC Manager of Pros Plan, Design, Construction
Greg Chol	TAC Aurora Water Asset Manager

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

Jill Piatt-Kemper	TAC Environmental Engineer
Geoff Rabinowitz	TAC Environmental Inspection Coordinator
Vern Adams	TAC Water Project Manager

1.4 Description of Program Elements

The Gap Analysis herein identifies gaps within the eight Program Elements of Aurora's Stormwater Program, described as:

1. **Asset Management** – Responsibilities within this Program Element include, but are not exclusive to: establish primary asset register, develop and implement asset inspection and assessment programs, develop and implement stormwater risk assessment and risk management programs, and implement staff training related to asset management.

2. **Floodplain Administration** – Responsibilities within this Program Element include, but are not exclusive to: track CLOMR & LOMRs, track pond certifications, review elevation certificates, coordinate flood response plan, and manage elements of the Federal Emergency Management Agency (FEMA) Community Rating Systems.

3. **Master Planning** – Responsibilities within this Program Element include, but are not exclusive to: develop and manage an Integrated Stormwater Master Plan, manage Urban Drainage and Flood Control (UDFCD)- and City-driven individual basin Outfall Systems Plans and Master Drainage Plans, and manage other special stormwater reports.

4. **Regulatory** – Responsibilities within this Program Element include, but are not exclusive to: provide inspections and reporting related to regulations and prepare and update MS4 Permit and other stormwater regulatory documents.

5. **Capital Improvement Projects (CIP)** – Responsibilities within this Program Element include, but are not exclusive to: leverage UDFCD Funding, identify and prioritize capital projects, and manage stormwater designs and construction projects.

6. **Operations and Maintenance (O&M)** – Responsibilities within this Program Element include, but are not exclusive to: maintain conveyance systems, maintain public detention and water quality facilities, manage stream corridors, provide spill response, provide drainage channel sedimentation management, and maintain all other critical stormwater infrastructure. Additionally, the Operations & Maintenance (O&M) Program Element includes emergency maintenance of private detention and water quality ponds (constructed after 2008 and which have maintenance agreements and drainage easements) during storm events.

7. **Data Management** – Responsibilities within this Program Element include, but are not exclusive to: track stormwater asset data in GIS, maintain conditions assessment data in INFOR, maintain storage of other stormwater documents, track

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

CIP Prioritization data, and maintain database of work orders and inspection reports.

8. **Financial Management** – Specifically focused on Aurora Water (i.e. not other departments such as Public Works), responsibilities within this Program Element include, but are not exclusive to: evaluate and plan budgets for all Program Elements, review stormwater expenditures by other departments, track internal budgets, and evaluate stormwater impact fees and user fees.

There are a few stormwater functions, for example Development Review, that are deemed to be sub-functions of the above Program Elements and which reside mainly outside the purview of Aurora Water. These types of functions are only addressed as they relate to the above Program Elements.

1.5 Findings Summary: An At-A-Glance Review

This section presents an abbreviated summary of the most important aspects of each Program Element that the City should consider addressing. It is broken down by Program Element. In addition to this summary, Section 2 presents a complete list of all gaps identified during our gap analysis.

Asset Management Summary

With respect to Asset Management the City should consider the following:

- Fill the gaps in the data systems related to asset management and formulating a standard process for obtaining and storing asset information, including what types of data and metadata are collected for each type of asset, where each piece of information is stored, and links that connect information across systems (if applicable). Where data exists but is questionable within the system, the City should list asset types and data that need to be quality checked or field measured/verified.
- Establish a process for the prioritization and implementation of projects identified during ongoing *"Conditions Assessments"*, master plans, field inspections, etc., including how projects will be assigned as either "asset management" projects, "O&M" projects, or "CIP" projects.
- Solidify all procedures that are undefined or loosely defined, including inspection procedures, GIS and INFOR data entry, conditions assessment incorporation and funding processes, work order entry data workflow for all asset types, etc. Procedures should be well-documented.
- Develop a plan for completing conditions assessment of the entire asset inventory. The list of asset types should be prioritized to determine the most critical, and a timeline should be established for all asset types that have not been assessed and funding allocated for those that are unfunded.
- Establish an Asset Management Program Element training regime to include all aspects of the Program Element data entry, assessment, extent of failure, types of failure risk, costing, inspection, work order processing, etc.

Floodplain Administration Summary

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

With respect to Floodplain Administration the City should consider the following:

- Develop and implement an electronic filing and tracking processes for CLOMRs, LOMRs, pre-1998 documents, and elevation certificates in both GIS and AMANDA.
- Refine the Certificate of Occupancy process to ensure that pond certifications are issued prior to issuance of the Certificate of Occupancy, without exception.
- Improve access to existing documents on individual properties by making changes to the City's website such that locating documents is easier.
- Evaluate recent changes in Federal Flood Risk Management Standards (FFRMS) in January 2015 as Executive Order 13690, as they may have a dramatic impact upon Aurora projects and properties within the City, particularly where Federal action is associated in any way. Draft a document that provides an interpretation of how these Standards might impact work in and around floodplains.

Master Planning Summary

With respect to Master Planning the City should consider the following:

- Complete an audit of the UDFCD drainage reports, including OSPs and MDPs (some of these elements such as tributaries, hot-spots, and mini-subbasin have been completed as affiliated with this ASWMP but not all elements have been completed). In association with this ASWMP, create project cut sheets for all potential CIP projects that are shown in the existing master plans. (proposed as part of Phase 3)
- Complete an audit of development-related and growth-related master drainage plans and projects. Resulting individual projects should be represented by a project cut sheet and run through the CIP prioritization model. (Proposed as part of Phase 3)
- Create a GIS dataset that includes all properties that need to be acquired in order to implement all projects that have been included in the CIP Prioritization Model. All acquisition costs and timing should be tied to a specific project such that the CIP prioritization model can consider these elements accordingly (Proposed as part of Phase 3).

Regulatory Summary

With respect to Regulatory issues the City should consider the following:

- Establish a means for ensuring that they are aware of and in compliance with all future regulatory requirements.
- Revise the process of Inspection & Maintenance (I&M) agreements and pond maintenance. There are gaps in the way that the system is currently executed and/or in the way that they staff feels empowered to execute the rules and regulations.

CIP Prioritization

With respect to CIP Prioritization the City should consider the following:

- Implement a strategic approach to organizing information and prioritizing capital project and maintenance activities for program planning, funding, and justification purposes.
- Clarify how funds are allocated, how fees are used, how projects are funded, etc. by preparing a guidance document or defining a policy.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

- Invest in additional staff resources in order to execute the number of identified and available capital projects.

O&M Summary

With respect to Operations and Maintenance of Stormwater Assets the City should consider the following:

- Standardize the process for inspecting conduits under public streets.
- Develop a tablet based system to be used by field staff, create standard inspection process, create standard forms for inspections, scan past PDF or hard copy inspections so that they are available to field staff. CCTV, photo, and other information should be part of the system as it becomes feasible.
- Improve sediment management in drainage channels by creating a stronger method for assessment of vegetation and degradation, including documentation of the planned and modeled vegetation for stream channels.
- Update the Integrated Stream Management Plan to address tasks and responsibilities. The update should consider how aspects of the plan might be tracked in GIS and available to field personnel.
- Rectify the fact that inspection and correction information is vested in a single individual. Consider ways to make the data more accessible across departments.
- Revise the MOU between the AW and PW to be clearer; add information about cross pans and clarify roadside ditches.
- Revise methods of addressing emergency projects to speed up delivery.
- Revise the method of tracking small projects to ensure that all projects are being addressed, prioritized, funded, etc.

Data Management Summary

With respect to Data Management the City should consider the following:

- Complete the asset data architecture. Establish all protocols needed to ensure the accurate and complete entry of data into GIS, Oracle, AMANDA and INFOR.
- Consider ways to integrate GIS, Oracle, and INFOR data that minimize data entry hour and maximize its availability to all staff within the citywide stormwater program (i.e. AW, PW, PROS, etc).
- Consider what workflow training is needed in the future to maximize staff efficiency using GIS, INFOR, and other data sources.
- Complete data-related aspects of the improved I&M monitoring process, including improving access to agreements with private owners, providing consistent storage of inspecting data, facilitating monitoring of water quality facilities, providing easy annual reporting, etc.
- Complete entry of all available as-built drawings, approved drainage reports, SWMPs, and 404 Permits into the GIS and Oracle systems.
- Coordinate data systems with UDFCD to eliminate overlap and facility linking as appropriate (Being done as part of Phase 3).
- Develop data system needed to track minor construction projects associated with the O&M and Asset Management Program Elements to ensure that as these minor projects are identified, documented, and prioritized in a way that ensures that all dollars are spent and directs funds to the most important projects.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

Financial Management Summary

With respect to Master Planning the City should consider the following:

- All Program Elements lack consistent budgeting and tracking, which makes defense of expenditure and rate structures difficult. The City needs a defensible approach to funding and budget projections that account for operation and maintenance, asset life cycle, flood repair, replacement, etc. using a method that meets the City's Overarching Priorities related to public safety, efficiency, quality, risk, etc.
- The user fee rate structure is not equitable for customers, and the City should investigate the benefits of impervious area based rate structures and the tools/systems/changes required to implement such a change. If a new fee rate structure is adopted, the City may need to review the development impact fees subsequent to the adoption of the new fee rate structure. *NOTE: Refer to report titled "Impervious Area Based Rate Structure Options."*
- It is not clear whether particular projects are funded by CIP funds, Maintenance funds, or Asset Management funds and what type of conditions would dictate to which pocket of funds these projects are assigned.
- Currently there is a list of needed projects that are funded annual out of maintenance dollars, but there is not a way of prioritizing these projects so the completion tends to be ad hoc as funds are available.

2.0 Gap Analysis

2.1 Process of Gap Identification

The process by which gaps were identified for each Program Element was consistent across Program Elements but was also tailored for each specific Program Element. The process included:

1. Review existing relevant documentation, including the Phase 1 report and supplemental documents.
2. Review and revise the respective Function Matrix with comments from staff.
3. Meet with key staff members involved with the Program Element.
4. Meet with outside agencies when applicable (such as UDFCD, SEMSWA, etc.).
5. Ask follow-up questions in telephone conversations or interviews with designated staff.
6. Review the answers to the questions in the *Industry Comparison (refer to "Industry Comparison," a survey of other Stormwater Utilities that was organized in order to provide a benchmark and comparison for the Aurora Stormwater Program).*
7. Complete specific tasks in the scope of services relative to each Program Element.
8. Update the Function Matrix.

2.2 Gaps by Program Element

As a result of the Program Element review(s), this Gap Analysis has identified gaps, overlaps, and potential enhancements of the Stormwater Program. The Gap Analysis for each Program Element is described in a standalone way. However, most of the Program Elements are linked with others. The linkages are noted in the

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

last section of the Gap Analysis write-up for each Program Element. Hyperlinks to each Element are embedded in the following list of Program Elements.

A. ASSET MANAGEMENT

1. Asset Management Program Summary

Asset Management is key to the successful implementation of Aurora's strategic plan, funding, and decision-making. The Asset Management Program Element consists of those functions that track Aurora Water's stormwater assets and infrastructure. These functions include the proper implementation and execution of the asset database (GIS, GYPSE, ORACLE, and INFOR), lifecycle costing and tracking, assessment of asset conditions, and long-term planning for infrastructure rehab and replacement.

Various Asset Management attributes are tracked in GIS, GYPSE, ORACLE, and/or INFOR, but the systems are not consistently tracked or input in accordance with a mandate/process. According to the City's expressed desires, the majority of the Asset information should live in INFOR.

As of this report, the INFOR 8.2.3 upgrade is complete and version 8.4 is expected in 2016. The current version of INFOR is largely used out-of-the-box by the City of Aurora, with a few customizations for environmental use (e.g. acid neutralization, tank detail pages, etc.). The City utilizes the reporting capabilities of INFOR (Crystal Reports) but is currently not using the standardized dashboard capabilities. SWL Server Reporting Services (SSRS) is being used for newer reports, and the City recently switched fully to SSRS. In INFOR, there are no CIP costs or disposal costs, and there is no direct correlation to budget costs. However, personnel currently run reports that roll up these costs and then manually compare these figures to the budgets. Currently, the INFOR system includes data and GIS attributes, but Oracle or other systems may be linkable in the future.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

2. Relevant Documents and Resources for Asset Management

For documents and resources used in the evaluation and identification of gaps, please refer to *Appendix B, Bibliography & Referenced Works.*

3. Asset Management Gaps

- The Asset Management system should support interdepartmental communication through the sharing of information such as project location, schedule, and budgets.
- GIS data is incomplete or of questionable quality with respect to various types of data, including drop structures, pipe systems, manhole and pipe depths, public vs. private facilities, and ponds. *(NOTE: a process is currently underway to identify public vs. private ponds and update pond data accordingly).* Similarly, metadata within GIS is often difficult to interpret, incomplete, or non-existent.
- The existing asset register (INFOR) includes inconsistent or incomplete data for some asset types, including incorrect data and/or unnecessary data. For example, vertical data is missing, private vs. public assets are incorrectly labeled, high risk data is incorrectly labeled and/or incomplete, etc.
- Assets are disconnected internally within Aurora Water, as well as between Aurora Water and Public Works. For example, some assets are listed in Public Works that do not exist in the Aurora Water register.
- There is no formal or objective level of quality for data.
- Aurora Water needs a critical asset level of service methodology.
- Condition assessment data is lacking for certain asset types. For example, CMP pipes have been assessed (2013-2014), concrete channels have been assessed (2007), and RCP pipes are currently being assessed, but open channels, drop structures, and other structures have not been assessed or have been assessed in a limited manner.
- Conditions assessments are not documented/requested on regular work order forms.
- It is not currently established how results from assessment studies will be utilized to formulate, organize, and execute projects. For example, the current plan is to fund projects that are identified from the CMP and RCP assessments separately from projects in the CIP Prioritization model. However, as the CMP, RCP, and other conditions assessments are completed, the results need to be correlated between asset management, O&M, and CIP. Currently, no process exists to ensure that the results of conditions assessments are coordinated between these Program Elements to ensure that adequate funding and staffing is available.
- Similarly, it is not clearly documented how construction and maintenance projects that are identified during a conditions assessment

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

process are assigned as either CIP projects, asset management projects, or O & M projects.

- There is a lack of as-built data and a lack of confidence in the data that exists within the City's systems. Current as-built drawings do not meet a predefined standard.
- There is not currently a succession process for the continuity of the program when staff changes, risking loss of institutional (and other) knowledge.
- CADD drawings that are submitted by engineers for proposed projects are not required to meet standards, which would simplify the asset management process and improve data quality.
- Inspection of assets is not well-documented. As a result, some assets are inspected by both UDFCD and Aurora Water.
- The process for maintaining and inspecting conduits under public streets is not standardized.
- The City does not have a firm process for the collection of asset attributes. *(NOTE: Technology is available that would allow the exchange of data from office-to-field and field-to-office through tablet computers; acquisition is underway).*
- Although the City now scans manually-written inspection reports to PDF, there are many reports that are only available in the manual filing system (i.e. not available via tablet or electronically).
- Aurora Water does not have an asset failure prediction process.
- Aurora Water has not established intervention points for each asset type, nor has it assigned a risk rating or defined failure modes.
- Aurora does not have a process or policy for useful life determination of all assets.
- Aurora Water does not currently provide a formal lifecycle cost methodology.
- Aurora Water does not currently have a replacement cost valuation methodology for assets. Strategic program planning and funding practices should be revised so that current replacement value and depreciation are calculated at the asset level.
- No formal training program exists for conditions assessment.
- There is not a standard inspection process or form at the City, including forms for specific elements (i.e. CMP, RCP, channels, drop structures, etc.).
- There is a disconnect between MAXIMO and other systems (City is currently working on this).
- The City plans to utilize INFOR's tablet solution, but systems, processes, and workflow requirements must be established before "going live."
- The City has occasionally found 'special' agreements offline (i.e. not in Aurora) with regard to who will/should maintain assets within Aurora boundaries. These types of documents should be accessible to Aurora

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

staff through integration with GIS/INFOR or through partnership with Real Properties.

4. Asset Management: Linkages to Other Program Elements

CIP Program- Asset Management is an important part of the CIP Program because asset projects that are identified as CIP projects need to be included in the prioritization process used for the CIP Program.

O&M Program- A portion of the projects necessary for Asset Management will be dealt with in the O&M Program. A decision process involving the CIP and O&M Programs will determine whether a project should be considered a capital project or maintenance project.

Data Management- Project planning and tracking within the Data Management Program Element will identify past and future Asset Management Projects.

Financial Management- Asset Management will be budgeted within Financial Management to provide adequate funding and accounting for the projects.

B. FLOODPLAIN ADMINISTRATION

1. Floodplain Administration Program Summary

The Floodplain Administration Program Element is charged with regulating the Federal Emergency Management Agency (FEMA) identified floodplains within City of Aurora limits through the National Flood Insurance Program (NFIP). This includes evaluating Letters of Map Change (LOMC), such as Conditional Letter of Map Revisions (CLOMRs), Letter of Map Revisions (LOMRs), and Letter of Map Amendments (LOMA), etc.; issuing City floodplain permits for work within the floodplain; complying with requirements for participation in the NFIP; storing Elevation Certificates (private Licensed Surveyor or Professional Engineer provides Elevation Certificate to the City for use by insurance companies, for floodplain delineation, for basement/crawlspace evaluation, etc.); and working within state and federal regulation requirements to ensure the City's code and ordinance remain up to date. *NOTE: Floodplain Administration and the City's Floodplain Administrator are based in Public Works, with some overlap and input from Aurora Water programs.*

2. Relevant Documents and Resources for Floodplain Administration

For documents and resources used in the evaluation and identification of gaps, please refer to *Appendix B, Bibliography & Referenced Works.*

3. Floodplain Administration Program Findings and Gaps

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

- There is not an identified and implemented succession process for continuity of the program if/when staff changes.
- Establish an easy way to get FEMA Information whether linking to FEMA's website or to an internal database that provides FEMA information.
- The information that is provided on the National Flood Hazard Layer for the City of Aurora is comprehensive but is not the most current information. Aurora's Floodplain Administration has acknowledged this gap and will hopefully be working toward resolving this gap.
- The City is inconsistent in logging LOMC effective notice and effective dates into AMANDA (electronically).
- The floodplain determination and tracking process needs to be converted to an electronic process (currently written/manual).
- Documents prior to 1998 are stored electronically but not accessible to all interested parties (i.e. not accessible via GIS to all staff and/or outside consultants).
- The City's GIS system is not currently used to document LOMRs or CLOMRs because the City is not receiving the "approved" LOMCs in a format that is conducive to importing into GIS.
- Elevations Certificates are not available via AMANDA (electronically).
- Technically, the City is not allowed to issue a Certificate of Occupancy without pond certifications. However, this rule is not always followed, leading to discrepancies regarding ownership and operations/maintenance of ponds. The City desires to (and needs to) work with the customers, but the City should establish an enforceable means of making customers accountable.
- Information, such as previous floodplain documents and approved drainage studies, is difficult to locate on the City's website, thereby making it difficult for the public and City employees to access.

4. Floodplain Administration Linkages to Other Program Elements

Master Planning Program- The primary Program Element linked to Floodplain Administration is the Master Planning Program. Many of the floodplains are generated as part of planning studies that are managed within the Master Planning Program and, thereafter, are reviewed, revised, and certified by the UDFCD and Colorado Water Conservation Board as floodplains. When the entire creek reach is updated with these studies and whole DFIRM panels are impacted by these studies, then this is forwarded to FEMA for Physical Map Revisions.

Regulatory Program- The Floodplain Administration Program Element includes evaluation and enforcement of the floodplain itself, whereas the Regulatory Program Element is specifically focused on water quality (MS4,

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

etc.). Therefore, although these Program Elements have some commonalities, they are not directly linked.

Data Management Program- The Data Management Program Element is linked to the Floodplain Administration Program because the Data Management Program needs to work with Floodplain Administration to develop a process to track and file LOMR's and CLOMRS and complete many of the gaps identified for the Floodplain Administration Program.

Financial Management- The Floodplain Administration Program is funded by the Public Works Department and is, therefore, not linked to Financial Management.

C. MASTER PLANNING PROGRAM

1. Master Planning Program Summary

The Master Planning Program Element is charged with identifying and implementing (in cooperation with the Project Delivery Services Division) the immediate and long-term goals of the Stormwater Program, specifically related to Capital Improvement Projects, maintenance projects, and other needs for the Stormwater Program. Program functions include overseeing and/or coordinating master planning activities, UDFCD planning projects (specialty design reports are completed by Engineering Services), long-range infrastructure planning, master planning inventory & updates, identification of projects related to growth and water quality, identifying CIP projects for project funding evaluations, annexations, and Intergovernmental Agreements (IGAs). These planning functions provide the basis for developing immediate and long-term plans for stormwater infrastructure.

For Master Planning, it is important to note the overlap with UDFCD. For example, where the City does not label in GIS properties that are slated for acquisition, most of the UDFCD master planning studies have identified properties of this type. There may be an ability to resolve some of the gaps herein by utilizing information available through cooperation with UDFCD.

2. Relevant Documents and Resources for Master Planning

For documents and resources used in the evaluation and identification of gaps, please refer to *Appendix B, Bibliography & Referenced Works.*

3. Master Planning Program Findings and Gaps

- Studies are not ranked on economic/social/environmental factors (triple bottom line).
- City needs training associated with asset management as it relates to master plans. Refer to Phase I study for more information.
- The City has not incorporated risk-based planning.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

- The UDFCD five-year plan has not been incorporated into the Aurora Water processes or systems.
- There are stormwater projects that are derived from master plans - but that are outside of the UDFCD master planning realm - that need to be added to the Aurora Stormwater Master Plan (ASWMP) and the CIP prioritization process, including system improvement projects outside of major drainageways, development-related improvements for cost share, etc. *(NOTE: May require creation of project cut sheets).*
- Projects that are derived from master planning efforts will need to be evaluated in the prioritization model.
- How many projects outside of UDFCD master plans have been evaluated from a hydrology/hydraulics standpoint is unknown. Therefore, some master plan projects are in need of further hydrology or hydraulics analysis. It is anticipated that some projects of this type will need further hydrology or hydraulics analysis.
- Developer-related projects that are not a part of UDFCD Master Plans need to be integrated into the overall master plan, need to have project cut sheets, and need to be run through the prioritization software.
- Currently, there is not a repository or process for tracking or prioritizing developer-related projects, and the process is done ad hoc.
- The City does not have an overall database or a GIS-based data set of properties that are slated for acquisition or labeled as repetitive-loss properties.
- The City should develop a process to ensure that all master planning is compliant with MS4 permit requirements.
- No Integrated City-wide Stormwater Infrastructure Plan is in place, but is required by City Code, Chapter 2.00, Section 138-364, Master Plan. *NOTE: The City is in the process of developing this plan.*
- The City may need to complete more major basin studies and updates than the UDFCD budget currently allows for. Although UDFCD may be able to assist in the management of these studies, it is important to note that these studies would be funded by the City.
- There are out-of-date master plans that need to be evaluated and revised/updated because of age or current relevance.
- Most of Aurora has been planned through master planning-type efforts. However, there may be some small gaps.
- Aurora needs to develop a process for evaluating master plans, IGAs, Economic Development plans, etc. in order to generate a list of potential future projects.
- Annexation and/or Developer and Intergovernmental Agreements (IGAs) that require funding are not currently incorporated into the City's database system.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

- The City needs to better organize and document Extension Agreements to reduce the number of times the agreements change hands and provide a central storage location.
- Extension Agreements currently change too many hands and do not have one central storage location within Aurora's electronic network.

4. Master Planning: Linkages to Other Program Elements

Floodplain Administration- Many of the floodplains from the Floodplain Program Element are developed within the Master Planning Program Element and are subsequently forwarded to the Floodplain Administration Program for review, revision, and certification.

CIP Program- There is a significant linkage to the CIP Program because most of the CIP projects originate within the Master Planning Program. The criteria necessary to prioritize projects are found within the planning studies or will be developed by further analysis under the Master Planning Program Element.

Data Management- The information from existing and new planning studies is input into the software and mapping platforms.

Financial Management- As noted above, the project cut sheets developed from the planning studies and other sources should identify the source(s) of funding for each project. This should match the capital budgeting in the Financial Management Element.

D. REGULATORY PROGRAM

1. Regulatory Program Summary

The Regulatory Program Element is charged with regulating and enforcing various items defined by the City Code and Ordinances, along with State and Federal requirements. In addition, the Regulatory Program is charged with updating the applicable codes and ensuring that Aurora regulations remain in compliance with State and Federal regulations. The Floodplain Administration Program Element also assists in code enforcement in terms of meeting State and Federal floodplain regulation requirements, but the distinction should be made that these regulations are specifically linked to the Floodplain Program Element and left out of the Regulatory Program Element.

In order to move forward with regulatory compliance in the future, the City should create a process for addressing options for achieving compliance with future statewide and national regulations. In addition, the City will need to raise awareness regarding elements in the City Code or in policy-related stormwater practices that need revising in order to facilitate more effective, and compliance, stormwater program planning. For example, the City might consider potential changes to the City Code that would address recurring

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

issues with lot drainage, water quality, appearance, and functionality of drainage facilities.

The City of Aurora needs to overhaul their program for long term maintenance enforcement of private Best Management Practices (BMPs). Currently, I&M Plans and Annual Reports are currently often not submitted, and owners often do not want to sign the required I&M until after plans are approved by the City, providing an opportunity (loophole) for owners to escape from maintenance obligation. For this reason, I&M plans need to be more detailed, better training needs to be provided, better organization of the certification process needs to be established, monitoring processes (pre-, during, and post-construction) need to be clearly defined, a strict and enforceable penalty process needs to be developed, responsible parties need to be clearly defined, timeline for maintenance and inspection needs to be defined, and systems for annual reporting need to be improved. In order to meet the MS4 requirements for water quality and stormwater control measures (BMPs), the City must provide improved documentation, legal agreements, inspection/maintenance records, etc. that will ensure long-term operation and maintenance of stormwater control measures. The City must also develop clear policy and code requirements that to enable developers and property owners to understand their role in the construction, inspection, and maintenance of water quality features. Finally, the City must develop code that enables City staff to enforce these construction, inspection, and maintenance responsibilities. Perhaps the City could require that a Professional Engineer sign off on the pond in line with a pre-determined timeframe. (More details in the Gaps below).

With regard to private regulatory compliance, the City should evaluate the effectiveness of its outreach to the private development community and identify ways to more effectively promote the inclusion of Low Impact Development (LID) BMPs in private development design proposals. For example, leverage the LID study that has been completed by Planning by proposing new potential legislation.

For the future of the program, the City of Aurora has expressed interest in a GIS/map-based system to show basin/system/drainage connectivity between all elements and to track discharges.

Finally, the City and the Colorado Department of Public Health and Environment (CDPHE) are currently drafting an MS4 Permit. This Permit will likely be finalized before the overall stormwater program is finalized, and the new permit should be considered with regard to this gap analysis.

2. Relevant Documents and Resources for Regulatory Program

For documents and resources used in the evaluation and identification of gaps, please refer to *Appendix B, Bibliography & Referenced Works.*

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

3. Regulatory Program Findings and Gaps

- The City does not currently have a process for monitoring and implementing future regulatory compliance requirements (statewide and/or national).
- The City needs to develop workflow options for achieving MS4 compliance and data sharing.
- To meet MS4 requirements, the City needs to improve their documentation, legal agreements, temporary water quality BMP enforcement (construction, volume documentation, outlet characteristics, maintenance, etc.), and inspection/maintenance records.
- The City is lacking sufficient staff training to facilitate the implementation of spill response, illicit discharge, identification of non-stormwater discharges, and other program components under the MS4 permit.
- SWMPs and 404 permits are not documented in GIS.
- Enforced actions are not currently included in GIS.
- GIS needs to incorporate Division of Wildlife Information and wetland mapping.
- The City needs an integrated stream corridor management plan that is integrated into GIS or another program.
- Public Works and Aurora Water do not share operating plans with one another (including illicit discharge program).
- The City needs another compliance inspector for enforcement related to the MS4 and water quality issues.
- The City does not currently require developers/agencies to follow UDFCD criteria on development site plans, and many projects, therefore, are at risk of losing maintenance funding from UDFCD.
- All inspections are not currently tracked in INFOR.
- Annual reporting is not automated, creating requirements for increased manpower and time to complete.
- Currently, there is no “hammer” to ensure private ponds are maintained and procedures are unclear (see also summary in Section 1 above):
    - The certification process is not well-defined.
    - The City needs more direction with regard to how to proceed when issues are discovered.
    - City Ordinance 146-1434 only addresses ponds built after 2008, so there is no direction with regard to ponds built before 2008.
    - The City needs to inspect ponds on a regular basis to determine problems.
    - The system for tracking stormwater ponds after they are complete and move to operations is insufficient (i.e. when/at what time this is done, where list is contained, who has access

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

to that list, who is in charge of maintenance, closing gaps/loopholes in City Ordinance, etc.).
    - Aurora needs to establish a process and timeline for transfer of ownership from private owners to the City (for BMPs).
    - Aurora needs to establish who follows up with private entities with regard to ownership and management.
    - Water quality facilities should be designed, constructed, and maintained in a way that meets MS4 requirements.
    - Private ponds should have GIS numbers.
    - I&M plans are not being tracked in a location that all of the necessary parties have access to.
    - There should be a link to I&M plans in the pond file.
    - AMANDA tracks pond review but not final approval.
- Staff training relative to water quality, detention, and erosion control needs to be kept up to date.
- The City does not offer a wetlands layer on GIS.
- Currently, SWMP and 404 permits are not consistently entered and stored in the same location.

4. Regulatory: Linkages to Other Program Elements

Master Planning Program- The execution of planning studies involves knowledge of all pertinent regulations from the Regulatory Program. Planning project managers should work closely with Regulatory Program staff, demonstrating the link between the two Programs.

CIP Program- Capital projects are required to be implemented in accordance with all requirements from the Regulatory Program. Good communication between these two Programs is vital.

O&M Program- The O&M Program completes the maintenance required for the Regulatory Program, which is a very important linkage. Good communication between the two Program Elements is therefore necessary.

Data Management Program- A linkage occurs here because better monitoring and reporting of required MS4 activities impacts and is required of both Regulatory and Data staff. In other words, staff from each Program will need to work together to accomplish this improvement.

E. CAPITAL IMPROVEMENT PROJECTS (CIP) PROGRAM

1. CIP Program Summary

The Capital Improvement Projects (CIP) Program Element is charged with identifying, designing, and constructing Capital Projects to be funded by

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

Aurora Water with stormwater user fees, development fees, and other sources of stormwater income.

The City of Aurora currently lacks a strategic approach to organizing information and prioritizing capital project and maintenance activities for program planning and funding purposes, including recurring maintenance items with significant costs such as sediment removal. Currently, this type of decision-making is done on an ad-hoc basis. However, the City is presently in the process of developing a decision-making tool for regularly and consistently evaluating and planning CIP, maintenance, and other projects utilizing the Expert Choice software. This process will include prioritization, funding allocation, and justification elements.

Stormwater projects are funded through a variety of sources including FEMA, UDFCD, City impact fees, and City Stormwater Utility funds. In order to justify projects, allocate funds appropriately, and defend the use of public funds, the City will need to demonstrate funding needs, mechanisms, sources, and protocol. A clear and defensible process will need to be written and documented for application on future projects.

The City is currently in the process of evaluating existing master plans (OSPs, MDPs, etc.) to assemble a list of proposed CIP projects. Alongside this process, the City should develop a consistent procedure and timeline for evaluating master plans (and other similar venues for discovering CIP projects) and determining future CIP projects. Finding and documenting CIP projects to put within a comprehensive master plan will require looking in other City documents and departments. There may be projects outside the master planning realm that need to be added to the master plan and the CIP cut sheets.

2. Relevant Documents and Resources for CIP Program

For documents and resources used in the evaluation and identification of gaps, please refer to *Appendix B, Bibliography & Referenced Works.*

3. CIP Program Findings and Gaps

- The City lacks the staffing and resources needed to undertake the large number of available capital projects.
- Documentation of primary and supplementary funding sources are not adequately defined, described, and documented for each CIP project.
- Training is needed with regard to various funding sources and mechanisms and how these relate to CIP and other projects.
- City needs to develop a process for improving coordination with the UDFCD 5-year and long term plans.
- Timing and procedures for integrating CIP project information into the GIS system are not established.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

4. CIP Program: Linkages to Other Program Elements

Asset Management- The CIP Program carries out projects that are developed in the Asset Management Program. The Asset Management projects should be identified and funded separately from other CIP projects.

Floodplain Administration- CIP projects will sometimes require LOMRs and CLOMRs. Therefore, coordination with Floodplain Administration is necessary.

Master Planning Program- The Master Planning Program is the source of many of the CIP projects. Therefore, coordination between the CIP Program Element and the Master Planning Program Element is necessary to develop planning projects with the necessary criteria for construction and prioritization in the CIP Program.

Regulatory Program- CIP projects must meet Regulatory requirements. Therefore, coordination between these two Program Elements is necessary.

O&M Program- CIP projects should be constructed with future maintenance in mind. To qualify for UDFCD maintenance, a CIP project needs to be approved by UDFCD for maintenance. For non-UDFCD projects, CIP projects should be approved by Aurora O&M. Therefore, there should be significant coordination between the CIP Program Element and the O&M Program, as well as externally with UDFCD.

Data Management- Construction drawings, as-built drawings, and GIS locations of constructed CIP projects should be forwarded to Data Management.

Financial Management- CIP projects are budgeted by the Financial Program for 1-year, 5-year, and 10-year periods to assure that funds are available for design and construction, demonstrating the link between the CIP Program Element and the Financial Management Program Element. Similarly, CIP projects also need to be accounted for under the proper budget: user fee projects, asset management projects, or development projects.

F. OPERATIONS AND MAINTENANCE (O&M) PROGRAM

1. Operations & Maintenance (O&M) Program Summary

The Operations and Maintenance Program Element is responsible for maintaining all Aurora stormwater infrastructure and facilities. For example, last year, the O&M group inspected all FEMA drainageways, plus four miles of other channels. A number of steps were taken to further identify gaps related to the Operations and Maintenance Program Element, including review of the

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

resources outlined herein, meeting directly with the City's O&M Superintendent, and cross-referencing notes from other Program Element meetings. Based on this work, the following is a complete list of the gaps identified during Phase 2, broken down to match the Function Matrix for this Program Element:

O&M activities are tracked in a spreadsheet that is utilized and maintained by the Superintendent of Stormwater Operations, subjecting the City to risk of that staff member were to leave. For example, inspection forms are Word documents with a built-in feedback loop that lets inspectors know what has been done for the asset in the past. These documents are submitted to the current Superintendent, who enters the Information into an Excel spreadsheet. The spreadsheet has links to problem areas, photographs, and other relevant documents. The spreadsheet includes "problem codes" (high activity problem areas) that are assigned to work orders. This valuable, extensive document is not currently available to other staff (via INFOR or other). The spreadsheet is begun new every year, and O&M is working on how to track historical Information. O&M plans to continue using this inspection tracking spreadsheet, and the information is currently being transitioned into INFOR.

For the most part, work order data is initially written on paper and then input into to INFOR by a staff member. This process is not documented, and there is currently no condition assessment associated with regular work orders.

Video feeds present difficulty with the City's current systems because POSM (the video system) is not usable in INFOR. Therefore, Aurora is considering a shift to a format where video could be uploaded and then viewed with a "click." For now, the two systems, POSM and INFOR, do not "talk" to each other. The City is currently working on a process to link these systems and associated data.

In an effort to predict risks, schedule, funding needs, etc., O&M has tried to correlate maintenance data over time to predict how often various locations/systems/facilities would need to be maintained. They have not been able to prove (for all systems/facilities/etc.) any correlation that would be useful to risk or funding assessment.

The City is currently developing a tablet system and methodology to enhance the effectiveness and productivity of field staff.

There are aspects of O&M responsibilities that change as the sites change and evolve. For example, FHADs are determined based on certain channel section and vegetative cover, but significant changes in vegetative cover or sediment accumulation may change flood profile. These types of evolving issues and responsibilities need to be clearly addressed and responsibility defined.
The City would like the GIS to be able to compare storm frequency to design capacity. This applies to pipes as well as channels and in some cases streets.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

2. Relevant Documents and Resources for O&M Program

For documents and resources used in the evaluation and identification of gaps, please refer to *Appendix B, Bibliography & Referenced Works.*

3. O&M Program Findings and Gaps

- Many drop structures or check structures do not have asset IDs (Piney Creek).
- As-builts and storm revisions are not consistently updated in GIS.
- Maintenance reports from UDFCD are not input into INFOR and the costs that UDFCD incurs on maintenance are not always included in the UDFCD reports.
- The INFOR data needs to include a list of outfalls that require cleaning.
- Although the City scans recent inspection reports to PDF, there are still many reports that are only available in the manual filing system.
- The services that Public Works provides on roadside ditches are not tracked and shared organization-wide.
- As wetlands are identified, it would be convenient to have the mapping added to the GIS system. The City might also consider a city-wide wetlands delineation.
- Not all private conduits are currently in GIS.
- City does not have a strong program for adding private conduits.
- Not all conduits are labeled correctly in GIS as private or public.
- City needs a better process of establishing which ownership Information of private conduits should be available in the field.
- There are data sharing/scheduling gaps between work that is completed, scheduled, and tracked in Public Works versus work that is completed, scheduled, and tracked in O&M. (Example: work on channels).
- Items that are given to Public Works to maintain are not currently being tracked.
- The CCTV output is not in an easily usable format.
- Cleaning catch basins is required by the MS4 program, but there is not enough activity to predict risk.
- The City has not defined Level of Service in accordance with the MS4.
- The City needs a process that defines roles and responsibilities for the planning and scheduling of the work. For example, large corrective tasks and programmed maintenance should be scheduled and managed by maintenance planning vs. field supervisors.
- O&M managers need a tool that will predict operation and maintenance costs as a means of assisting with project justifications.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

- The process for maintaining and inspecting conduits under public streets needs to be standardized *(NOTE: inspection happens in Asset Management).*
- Also addressed extensively in the Regulatory section, various water quality and pond assets in the City are maintained by private owners. There is a lack of complete and accurate GIS Information (public vs. private, etc.) for private water quality ponds and pond assets, there is a lack of understanding by property owners of their maintenance and inspection responsibilities for private water quality ponds and pond assets, and there is not an ordinance that provides clearly defined requirements for the maintenance of private water quality ponds and assets.
- The City may have staffing gaps if the Highline Canal is migrated from Denver to Aurora for the purpose of providing water quality treatment.
- Sediment management in drainage channels needs improvement:
    - City needs stronger methods for assessment of vegetation and degradation, including documentation of the planned and modeled vegetation for stream channels.
    - Sites need defined flow line from sediment perspective and vegetation level so that both could be addressed simultaneously.
    - Improvement of the process will require staff training.
- The City needs to consider what (if any) elements of an Integrated Stream Management Plan should be included in appropriate master plans. NOTE: consider what information O&M staff might need in the field; consider whether a new Integrated Stream Management Plan (ISMP) is needed; consider what elements the ISMP should address (i.e. sedimentation, vegetation, corridor info, etc.).
- Aurora staff need training with regard to how streams should be managed and maintained, including basic identification of issues and resolutions.
- The current Integrated Stream Management plan stops short of assigning tasks and responsibilities.
- Lifecycle cost analysis is not completed in a formal manner.
- Memorandum of Understanding between Aurora Water and Aurora Public Works:
    - Roadside ditches need to be defined in more detail, and responsibility for maintenance and inspection needs to be more clearly delineated
    - Aurora O&M needs to meet with Aurora Streets Division (Kevin Wagner) to define roadside ditches and policy and procedure needs to be written.
    - Cross pans are not currently addressed in the MOU between Aurora Water and Public Works.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

- Because of internal Aurora processes, needed improvements taking too long to complete (for example, emergency-type requests). Aurora needs a comprehensive list of these types of issues and a process for fixing these types of problems.
    - Aurora does not have a process in place for small stormwater improvements. NOTE: O&M has extra funding to fix 3-6 of these per year but does not have the staff and construction oversight capability to complete these possible projects.
- The City needs an INFOR data listing that identifies outfalls that need cleaning.

4. O&M Program: Linkages to Other Program Elements

Asset Management- O&M performs restoration work on existing assets which should be coordinated with Asset Management.

Floodplain Administration- In some cases, O&M work needs to be completed to maintain floodplains. This needs to coordinated between the two Program Elements.

Master Planning Program- Maintenance access needs to be accounted for in the planning study designs. Therefore, coordination is necessary.

Regulatory Program- O&M needs to work closely with the Regulatory Program because many maintenance activities are required by regulations.

CIP Program- Some projects in the restoration category will need to be classified as either maintenance or CIP. This will require coordination between managers of the Program Elements.

Data Management- Data Management is linked to O&M because maintenance activities need to be scheduled and tracked.

Financial Management- O&M needs to be aware of the budgets set-up by Financial Management for different maintenance activities. Therefore, coordination is necessary.

G. DATA MANAGEMENT

1. Data Management Program Summary

The Data Management Program Element tracks stormwater asset data in GIS, maintains conditions assessment data in INFOR, maintains storage of other stormwater documents, tracks CIP Prioritization data, and maintains database of work orders and inspection reports.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

The Data Management group should work closely with UDFCD for master GIS and data maps because UDFCD has done a significant amount of GIS and layer planning work that may be beneficial to the City of Aurora, and the City of Aurora may have layers that would benefit current UDFCD efforts.

The City is currently working on a Standard Operating Procedure (SOP) for the integration and population of GIS.

2. Relevant Documents and Resources for Data Management

For documents and resources used in the evaluation and identification of gaps, please refer to *Appendix B, Bibliography & Referenced Works.*

3. Data Management Program Findings & Gaps

*** NOTE: data-specific gaps are also listed within each particular Program Element as applicable.*

- Aurora needs to incorporate a basin connectivity aspect to their GIS information so that conditions within each basin can be correlated with other parts of the basin.
- There is significant confusion across Program Elements with regard to what systems perform what functions and store what data. Therefore, Aurora's data solutions need to be well-defined and staff must be trained appropriately to use each system.
- Significant training is required to ensure appropriate and consistent use of Aurora's systems across Program Elements.
- The City does not offer one data management system that holds all stormwater infrastructure information (including, but not exclusive to, documents, records and asset data, drainage complaints, MS4 documents, etc.) that offers central storage and ability to share information internally and externally.
- There is a disconnect between the various assets that exist within the City GIS database and the City's actual assets. This disconnect includes pond data, public/private pipe data, drop structures, and other aspects of the system.
- The City does not require as-built data.
- The City needs to complete a QC review of all of the GIS data to see what is missing, inappropriately cataloged, stored incorrectly, etc.
- The City needs to add design storm frequency data to pipes in GIS.
- The City processes demonstrate inconsistent storage of data and reports (including inconsistent practices for storage, inconsistent completion of data reporting and recording, etc.).
- Currently, not all agreements are attached to an asset number.
- There is a gap in Aurora's system for tracking permits and inspections, especially with multiple filings.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

- Items that are not currently in GIS:
    - Complete incorporation of stormwater assets (public and private); older Aurora infrastructure; drop structures; design storm (do not need flow rate); elevations for existing stormwater assets; H&H; as-builts; old stormwater data; development agreements and requirements; easements; annexation agreements; development drainage reports.
- UDFCD GIS map is not mirrored to Aurora GIS:
    - There should coordination between Aurora GIS and UDFCD GIS to make sure that both agencies are not doing the same thing. There is not currently a system for providing ongoing monitoring of what Aurora is doing versus what UDFCD is doing.
    - Some of Aurora's naming conventions are different from UDFCD.
    - Aurora's systems should link to or reference UDFCD information where possible to prevent duplication except where necessary.
- Inspection and correction Information is currently funneled through one staff person who is soon-to-retire.
- Staff use a variety of applications to access data.

4. Data Management: Linkages to Other Program Elements

All other Program Elements are linked to Data Management because all Program Element activities need to be scheduled and tracked.

H. FINANCIAL MANAGEMENT

1. Financial Management Program Summary

The Financial Program Element includes tracking all stormwater expenditures and providing an annual report that details the expenditures in several funds and in a number of categories for each fund. According to the Stormwater Rate Study completed in 2012 by StepWise Utility Advisors, the three funds used by stormwater are the following:

- **Operating Fund-** accounts for the revenue earned from normal operation, including the user charges and all of the operating expenditures.

  Operating expenditures are reported in the following categories:
    - Ops Compliance - Storm
    - Storm Administration
    - Department Wide - Storm

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

- Customer Billing - Storm
- Plans Review - Storm
- WW Ops Admin - Storm
- Storm Drainage
- Clean H20 Program – Storm
- CIP Admin - Storm
- AW Ops Admin - Storm
- Business Service Admin - Storm
- AW Service - Storm
- Technical Ops - Storm
- Household Chem Roundup

- **System Improvement Fund-** accounts for capital expenditures and development fee income with the normal renewal and replacement of the existing stormwater assets.

  Operating expenditures are reported in the following categories:
  - Capital projects are listed individually
  - Levee Certification
  - Storm Drain System Improvement
  - Structural Rehab
  - Stormwater Management Plan
  - Infrastructure Upgrade/Mod

- **Development Fund**- accounts for the capital expenditures and development fee income for stormwater system expansions.

  Operating expenditures and income are reported in the following categories:
  - Plant Investment Fees (Development Fees)

The Financial Management Program Element also includes managing user fee income from the utility's combined billing process and assessing the user fee to new properties as they come into the system from engineering.

Expenses are charged directly to the accounts listed above. However, staff time is allocated by payroll category by interviewing managers prior to the budget year. This mostly applies to managers, as regular staff is usually allocated full-time to water, wastewater, or stormwater.

The City does not have a complete rate study, although they are in the process of reviewing rates and fees currently. The City should ensure that the completed rate study includes an analysis of existing and desired expenditures, meets the goals and objectives of this study, and funds the necessary expenditures.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

The City is in need of the ability to make projections for maintenance and capital budgets, but a full infrastructure inventory has not been completed. However, the City is in the process of inventorying various aspects of their infrastructure, including 8% of the CMP and 10% of the RCP. Once completed, these small-scale inventory investigations will help the City make calculated assumptions about the remainder of the infrastructure.

The City is currently evaluating development impact fees.

Funding can be considered from the perspective of closing all gaps (i.e. an ideal program) or from the perspective of how to best allocate a given amount of money (or a combination thereof).

2. Relevant Documents and Resources for Financial Management

For documents and resources used in the evaluation and identification of gaps, please refer to *Appendix B, Bibliography & Referenced Works.*

3. Financial Management Program Findings & Gaps

- All Program Elements lack consistent budgeting and tracking.
- Maintenance and administration expenditures are not broken down to an extent that adequately defends expenditures.
- Aurora Water does not currently have a comprehensive bond funding and, therefore, annually asks themselves if they require bond funding.
- A complete rate study, as cited above, should be implemented to determine adequacy of revenues and present rate options to achieve adequate revenues.
- The user fee rate structure is not equitable for customers, and the City should investigate the benefits of impervious area based rate structures and the tools/systems/changes required to implement such a change. If a new fee rate structure is adopted, the City may need to review the development impact fees subsequent to the adoption of the new fee rate structure. *NOTE: refer to the tech memo titled: Impervious Area Based Rate Structure Options.*
- Development impact fees need to be revised more often than they are currently (every two to three years) in order to incorporate projects that are identified in new master plans, projects that have been implemented, and changes in the construction cost price index.
- Aurora needs a program for lifecycle costing of asset management and operations and maintenance.
- The customer billing system and accounting system do not talk.
- Customer and billing data is in an HTE Sunguard system that does not currently interface with INFOR.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

- Customer complaints are handled by an overarching call center and may be input into INFOR if a work order results from the complaint. The Call Center also uses AMANDA for researching issues.
- Annexation, Developer, and Intergovernmental Agreements that require some level of funding should be incorporated.
- The City needs to complete an audit of existing UDFCD master plans, audit of non-master plan projects, Project Cut Sheets, and a complete CIP Prioritization model in order to establish preliminary CIP and Planning budget projections.
- Aurora needs preliminary budgetary level condition assessments and budgets for all asset types.
- The City needs a defensible approach to asset management funding and budget projections that account for operation and maintenance, asset life cycle, flood repair, replacement, etc. using a method that meets the City's Overarching Stormwater Program Priorities related to public safety, efficiency, quality, risk, etc.
- The City does not have complete preliminary projections of expenditures for the remaining Program Elements.
- Projects that result from conditions assessments are not necessarily being coordinated with all parts of the program.
- It is not clear whether particular projects are funded by CIP funds, Maintenance funds, or Asset Management funds, and what type of conditions would dictate to which pocket of funds these projects are assigned.
- Currently, there is also a list of needed projects that are funded annual out of maintenance dollars, but there is not a way of prioritizing these projects so the completion tends to be ad hoc as funds are available.

4. Financial Management: Linkages to Other Program Elements

Asset Management- Budget development.

Planning Program- Budget development.

Regulatory Program- Budget development

CIP Program- Budget development.

Data Management- Budget development.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

3.0 Conclusion

Although this document does not advise the City on means of resolving the gaps listed herein, these gaps should be resolved in order for the City to ensure proper functioning of their Stormwater Program. As mentioned during the introduction, the gaps listed at the top of each Program Element section are subjectively determined to be the most urgent gaps, based on conversations with staff, risks to safety, and implications for the City's budget. Recommendations for resolving gaps will be provided in a future Project Website Deliverable.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

4.0 Appendix A – Function Matrices

See following page.

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

Asset Management Division

Greg Chol, Manager

Function	Sub Function	Position (Title) Responsible for Managing and Implementing Sub Function	Where Documented or Studied	Data Systems Utilized	Level of Service (it was determined during Phase 2 that Level of Service determination will be developed in the future and only on an as needed basis)		Dept. with Primary Responsibility	Cross Departmental Coordination (Department)	Inner Departmental Coordination (Group/Division)	Individuals with Notable Responsibility	Current Status	Known Gaps	Notes
					Existing	Target							
Establish Primary Asset Register	Determine attributes required for each stormwater asset	Marisol & Chol	Phase 1, CMP Study	INFOR, GIS, Oracle	TBD	TBD	AW			Greg Chol	☐ Functioning as Needed ☑ Needs Improvement ☑ Needs Further Study	Inaccurate Data Present and Potentially Unnecessary Data, Establish name convention criteria, limited in GIS, most information in INFOR with links. Firm process needed for determining attributes for every type of asset. Need to determine which type of data goes in GIS vs INFOR. General preference is most asset mgmt info in INFOR	CMP study found attributes wrong, inconsistent or incomplete for most asset types, audit needed
	Establish rules and process for data quality reviews for Conditions Assessments	Marisol	Phase 1		TBD	TBD	AW				☐ Functioning as Needed ☑ Needs Improvement ☑ Needs Further Study	Contractor input for asset studies, development review and permitting transferred to INFOR. Rules for surveyed as-built drawings need to be put into place (should extension agreements specify). Determine what as-built information is cost effective to require and what is too costly to provide an effective return. Note that Denver has a system that requires CAD data in standard layers in order to facilitate asset management and GIS systems.	
	Establish Rules and Processes for Data Quality for Developer Built Projects	Chol									☐ Functioning as Needed ☑ Needs Improvement ☑ Needs Further Study	See Above Gaps	
	Develop Enhanced Communication Between Programs with Respect to Managing Assets Such as Channel Sedimentation				TBD	TBD	AW	PW			☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Coordinate AW and PW regarding managing the floodplains and doing stream maintenance	Minimize Systems / Spreadsheets for Asset Management
	Collect Existing Condition Assessment Data		CMP study complete, RCP underway		TBD	TBD	AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Condition assessment data is lacking for certain asset types. First what has been done, has not, frequency, schedule. Existing CMP, RCP, and conc channel assessments have not been used to establish full asset register consistent across all asset types	
	Provide, Review, and Enter Maintenance Data with Respect to Each Asset Type	Chol			TBD	TBD	AW	PW			☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Maintenance data is not consistently tracked for each asset type. After attributes are determined for each asset type it will need to be determined whether existing maintenance data is or is not logged for each asset type (for old data), and what future maintenance data is logged (see below under "Develop Inspection/Assessment Program. This was not deemed to be a high priority gap.	This is an O&M function, included here only because it relates to the asset register.
	Provide, Review, and Enter Historical Data	Chol responsible for quality control and input when needed			TBD	TBD	AW	PW			☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	This is done on a project by project basis. Currently not identified as an overall gap	Potential for Separate Databases that Could be Linked
	Maintain Current GIS Database for All Assets	Marisol			TBD	TBD	AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	GIS data is lacking for certain asset types	
	Determine assets requiring additional survey or data	S Young	Phase 1		TBD	TBD	AW				☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	A comprehensive look at all assets to determine if field data gathering is needed to complete GIS or Ass. Man.	
Develop Inspection / Assessment Program	Develop Inspection / Assessment Process and Rating System	Chol			TBD	TBD	AW			Greg Chol / Joe McCleary	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Multiple Condition Ranking Systems; AW and UCFCD Inspect and Maintain Same Infrastructure. No consistent ratings system or inspection process is in place.	Acquire UCFCD Data. CMP study identified a rating system, should be consistent through asset types
	Create Inspection / Data Logging Forms	Chol	Phase 1		TBD	TBD	AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Possibly automated system could be established using computerized field forms. Currently no standard exists for consistent gathering or logging of condition data.	Some work relative to this done in CMP study
	Develop an Overall Plan for Completing Conditions Assessment on All Asset Types	S. Young			TBD	TBD	AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Perform Inspections / Assessments	Planning, assisted by O&M and Project Delivery			TBD	TBD	AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	No Currently Condition Assessment with Regular Work Orders	Possible that routine condition inspection could occur with work orders
	Organize / Report Assessment Results	GIS and Asset Management			TBD	TBD	AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Multiple Steps Required for Report Input, CMP study resulted in large spreadsheet, how used?	Provide Electronic Field Data Displaying / Reporting System; Possible for Automated Input System
	Develop Process for Identifying How Projects Identified via Conditions Assessments are Budgeted, Assigned, and Completed	S. Young			TBD	TBD	TBD				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Currently the process is Ad Hoc. A method needs to be established for completing this function. There needs to be clearer delineation of how projects are budgeted and when they fall into the CIP/Expert Choice prioritization model.	
Develop Risk Assessment / Management Program	Develop Asset Failure Prediction Process	Chol			TBD	TBD	AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Not Currently Provided	
	Establish Intervention Points for Each Asset Type	Chol			TBD	TBD	AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Not Currently Provided	
	Develop Asset Remaining Useful Life Methodology	Chol			TBD	TBD	AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Not Currently Provided, CMP study has condition rating useful life, need for all asset types	Potentially Could Be Provided Through Hansen
	Develop Asset Life Cycle Cost Methodology	Planning relative to methodology, coordinated with Chol			TBD	TBD	AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Not Currently Provided	Potentially Could Be Provided Through Hansen
	Develop Critical Asset Level of Service Methodology and Maintain Risk Assessment & Management Data	Planning			TBD	TBD	AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Critical Asset Types were discussed in the Phase I Study. These asset types should be confirmed and work prioritized to address the critical ones first.	Potentially Could Be Provided Through Hansen
Develop Training for Asset Management Processes and Programs	Develop Asset Management Metadata	S. Young			TBD	TBD	AW			Greg Chol	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	• The City should determine what information they should be collecting, whether they are or are not collecting and storing it currently and consistently, whether people are being trained consistently to collect correctly, etc.	
	Develop Inspections / Assessment Training	CHOL			TBD	TBD	AW			Greg Chol / Joe McCleary	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	CMP study included no formal city training aspect, but this should be established and documented	
	Coordinate / Schedule Asset Management Program Trainings	CHOL			TBD	TBD	AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		

Asset Management Division

Greg Chol, Manager

Function	Sub Function	Position (Title) Responsible for Managing and Implementing Sub Function	Where Documented or Studied	Data Systems Utilized	Level of Service (it was determined during Phase 2 that Level of Service determination will be developed in the future and only on an as needed basis)		Dept. with Primary Responsibility	Cross Departmental Coordination (Department)	Inner Departmental Coordination (Group/Division)	Individuals with Notable Responsibility	Current Status	Known Gaps	Notes
					Existing	Target							
Implement Asset Replacement / Devaluation Program	Develop Replacement Cost Valuation Methodology	S. Young			TBD	TBD	AW	PW			☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Not Currently Provided	Denver Stormwater Master Plan Provides Example
	Develop Replacement / Rehabilitation Costs	S. Young			TBD	TBD	AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Not Currently Provided	Potentially Could Average with Annual Bid Tab Averages
	Maintain Current Replacement / Rehabilitation Costs	S. Young			TBD	TBD	AW	PW			☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
											☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		

CAPITAL IMPROVEMENT PROJECTS

Steve Fiori, Project Delivery Services Manager

Function	Sub Function	Position (Title) Responsible for Managing and Implementing Sub Function	Data Systems Utilized	Dept. with Primary Responsibility	Cross Departmental Coordination (Department)	Inner Departmental Coordination (Group/Division)	Individuals with Notable Responsibility	Current Status	Known Gaps	Notes
Leverage UDFCD Funding	Identify Projects for Potential UDFCD Funding or Partial	" "	N/A	AW	PW, AP	O&M	Steve Fiori, Joe McCleary	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	A quantitative process should be established for determining the funding source shares on capital projects	
	With UDFCD Initiate Projects and Participate as Needed	" "	N/A	AW	N/A	O&M	Steve Fiori, Joe McCleary	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Process Needs to be Developed	
	Coordinate with UDFCD 5-year Plan and Longer Terms Plans	Projects Delivery Services Manager	UDFCD Project Spreadsheet	AW	PW, AP	O&M	Steve Fiori, Sarah Young, Joe McCleary, Bill McCormick	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Process Needs to be Developed	
								☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
								☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
								☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
								☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
Prioritize Capital Projects List	Develop Project List from Master Plans	Planning Services Manager	N/A	AW	N/A	O&M	Sarah Young, Bill McCormick, Joe McCleary	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	List Needs to be Developed	
	Develop Project List from EDC/Development Projects	" "	N/A	AW	PW, EDC	O&M	Sarah Young, Cliff Stephens, Bill McCormick	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	List Needs to be Developed	
	Develop Project List from IGAs and Other Sources	" "	IGA Spreadsheet	AW	PW	O&M	Sarah Young, Cliff Stephens, Bill McCormick, Joe McCleary	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	List Needs to be Developed, IGA Spreadsheet may or may not actually exist?	
	Create Project Initiation Forms for New Projects	" "	N/A	AW	PW, EDC	O&M	Sarah Young, Bill McCormick	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Enter New Projects Into Expert Choice and DSMP	" "	DSMP	AW	PW	O&M	Sarah Young, Jon Villines, Bill McCormick, Joe McCleary	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Prioritize Capital Improvement Plan Annually Using Expert Choice and DSMP	" "	Expert Choice	AW	PW	O&M	Sarah Young	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Using DSMP or Expert Choice Prioritization as a Starting Point, Develop Short and Long Term CIP Plans	" "	Expert Choice	AW	N/A	O&M	Sarah Young, Steve Fiori	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		" "
	Coordinate CIP Needs w/Staff Resources	Project Delivery Services Manager		AW	N/A	N/A	Steve Fiori	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
								☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
Manage Stormwater Design & Construction Projects	Prepares Scope, Assign PM	Project Delivery Services Manager	EADocs	AW CPD	N/A	N/A	Steve Fiori, Project Manager As-Assigned	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	For In-house Design Prepare IDA, Assign Engineer	" "	" "	AW CPD	PW	N/A	" "	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	For MESA Projects Assign PM, Prepare Scope, and Evaluate Selection	" "	" "	AW CPD	N/A	N/A	" "	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	For RFP Projects Assign PM, Prepare Scope, Interview, Evaluate Selection	" "	" "	AW CPD	PW, AP	N/A	" "	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Coordinate with CDOT, RTD, etc. as needed.	" "	" "	AW CPD	N/A	N/A	" "	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Coordinate with O & M for maintenance needs in plans.	" "	" "	AW CPD	N/A	O&M	Steve Fiori, Joe McCleary	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Coordinate with Parks and Open Space if needed.	" "	" "	AW CPD	PROS	N/A	Steve Fiori, Curtis Bish	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Provide public involvement and education	Public Relations Manager	" "	AW PR	COA PR	N/A	Greg Baker	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Complete Design Work	Project Delivery Services Manager	" "	AW CPD	PW	N/A	Steve Fiori, Project Manager As-Assigned	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Provide Design Review, revisions and approval	Engineering Services Manager	AMANDA	AW Eng	PW, AP	N/A	*Vacant*	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Secure Permits	Water Permit Coordinator	N/A	AW CPD	PW	O&M	Asif Samuel	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Prepare interdepartmental agreements with other departments as needed.	Project Delivery Services Manager	N/A	AW CPD	PW, AP	N/A	Steve Fiori, Project Manager As-Assigned	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Prepare maintenance plan with maintenance department	" "	N/A	AW CPD	N/A	O&M	" "	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Obtain land rights, and maintenance easements as necessary.	" "	N/A	AW CPD	PW, ARP	O&M	" "	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Bid Work, Supervise Construction incl Surveying, Inspection & CA.	" "	EADocs (?)	AW CPD	PW	N/A	" "	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Complete As-built Process	" "	N/A	AW CPD	N/A	AW Engineering	" "	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Surveyed as-builts are not provided for CPD projects (same as for private developments). [Confirm]	

CAPITAL IMPROVEMENT PROJECTS

Steve Fiori, Project Delivery Services Manager

Function	Sub Function	Position (Title) Responsible for Managing and Implementing Sub Function	Data Systems Utilized	Dept. with Primary Responsibility	Cross Departmental Coordination (Department)	Inner Departmental Coordination (Group/Division)	Individuals with Notable Responsibility	Current Status	Known Gaps	Notes
	Provide As-Built Information to GIS for Transfer to Asset Management	" "	GIS, Infor	AW CPD	IT, AM	AW Planning	" "	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		After the Extension Agreement permits are issued, this is not really a CPD task.

STORMWATER DATA SYSTEM FUNCTION MATRIX

Function	Sub Function	Position (Title) Responsible for Managing and Implementing Sub Function	Source, Where Documented or Studied	Data Systems Utilized	Dept. with Primary Responsibility	Cross Departmental Coordination (Department)	Inner Departmental Coordination (Group/Division)	Level of Service (Level of Service shall be added as needed over time. Currently LOS has not been established for all functions)		Individuals with Notable Responsibility	Current Status	Known Gaps	Notes
								Existing	Target				
Track Stormwater Assets in GIS System	Establish procedures to enter data as projects are completed	Craig Ellis		GIS		GIS, PW, AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Basin connectivity has not been included, Possibly create more automated procedures with GIS. S.O.P.s for entering data should be	
	Provide data from previously as-built drawings to GIS for entry			GIS		GIS, PW, AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Unknown what the status of getting all previous project information into GIS. Desire has been expressed to add design storm frequency to GIS, possibly other hydraulic parameters.	Primary Additions are Ownership and As built Data
	Respond to requests for GIS data entry or query			GIS		GIS, PW, AW, other		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	GIS, Oracle, and Infor are not currently integrated to leverage all stormwater data	
	Complete the asset database for all asset types such as drop structures, energy dissipaters, etc.			GIS		GIS, PW, AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	The asset database currently does not include all storm drainage related infrastructure. An example is drop structures.	
	Survey and enter elevations for existing stormwater assets			GIS, other?		GIS, PW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Currently the GIS system does not have elevations for many asset types	Verify and record existing pipe, inlet, manhole, etc. sizes and materials during survey
	Establish minimum data quality req, and QC GIS stormwater data			GIS		GIS, PW, AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Concern has been expressed regarding the reliability of data in the GIS system	
	Leverage UDFCD Data to reduce need for duplication							TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Establish naming conventions for all assets, channel reaches, etc.							TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	This may have been done already?, Establish criteria for naming structure or pipe	Example of naming criteria: What structure would qualify as Flared End Section (FES) or Headwall (HW)?
Track Stormwater Assets Conditions, Photos, Videos, etc.	Provide condition assessments & asset management plans			INFOR, GIS?		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	A number of gaps may exist in the Infor system, including full GIS and Oracle integration, usage of existing data, gaps in data, use of cost information, historic information, asset information, etc. Phase 1 of the AISWMP indicated that "building the asset database" was a primary gap in the program	Ensure all infrastructure is rated on same rating system in order to relate all areas
	Establish procedures, enter conditions assessment data into INFOR			INFOR, GIS?		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☑ Needs Further Study		Linking all systems and programs to share data could provide necessary process accuracy and streamlining
	Establish procedures, enter condition assessment data into GIS, if needed			INFOR, GIS?		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Provide and upload photos and videos			ORACLE, INFOR?		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		Can provide database link in GIS for photos and videos
	Track Life Cycle Costs			INFOR, EXPERT CHOICE, GIS		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	QC asset management and condition assessment data			INFOR		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Track projects from conditions assessments or replacement programs			INFOR		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Many other uses are possible using Infor, and a gap exists in that there needs to be work to identify whether these uses would be advantageous, save cost, eliminate repetition, etc.	
	Determine asset failure mode to assist in prioritizing CIP or maintenance projects			INFOR		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		Asset failure mode needs to be established per each asset type and applied on universal scale
	Respond to requests for condition data			INFOR, GIS, ORACLE?		AW, PW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
Track Stormwater Hydrology, Hydraulic, and Conveyance Data	Enter H&H data from master plans or development projects			GIS		AW, PW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	H & H data does not currently exist in GIS, Which H&H Data is Necessary?	
	Enter Conveyance data to GIS or other appropriate software			GIS		AW, PW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Data gaps exist, for example there has been desire expressed for design storm frequency and design flows.	
	QC data			GIS		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	NEED to track sediment accumulation and erosion at conveyance systems	
	Respond to requests for conveyance data			GIS		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Efficiencies needed in data access to take advantage of existing systems	
	Coordinate data needs with UDFCD							TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	There is currently no coordination taking place between the data that UDFCD is tracking in GIS and what the City is tracking. The desire was expressed to minimize duplication in the databases.	
Track Stormwater Documents	Enter stormwater as-built drawings into database for new projects			ORACLE, GIS?		AW, PW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Gaps exist in data set	
	Enter old stormwater as-builts to complete data set			ORACLE, GIS?				TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Gaps exist in data set	
	Enter and monitor development agreement terms and requirements			ORACLE, GIS?				TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Gaps exist in data set	
	Enter/track developer and outside agency maint. Agreements			ORACLE, GIS?		AW, PW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Gaps exist in data set	
	Enter drainage easements and terms			ORACLE, GIS?		PW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Gaps exist in data set	
	Track annexation agreement terms			ORACLE, GIS?		PW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Gaps exist in data set	
	Track development drainage reports			ORACLE, GIS?		PW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Gaps exist in data set	
											☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
Track Stormwater CIP Prioritization Data, Cost, Priority Parameters	Enter stormwater project parameters into Expert Choice			EXPERT CHOICE		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Phase 2 will initially address	Establish CIP priorities with all parties to ensure all needs are being met
	Enter projects into EC as master plans are completed			EXPERT CHOICE		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Phase 2 will initially address	Establish expert choice process and training for performing analysis and calibration on system when necessary
	Update EC Parameters for CIP projects annually			EXPERT CHOICE		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Phase 2 will initially address	Once again, ensure ranking system in universally used to ensure all assets are given adequate importance
	Perform EC Analysis			EXPERT CHOICE		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Phase 2 will initially address	
	QC EC results			EXPERT CHOICE		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Phase 2 will initially address	
											☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
Track Work orders and Inspection Reports	Enter inspections reports into database			INFOR		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Establish field computerized form and upload process for completing forms, establish training	
	Enter work orders into database			INFOR		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Possibly automate upload / entry process to prevent errors / inaccuracy occurring. Tablet based input of work done in field, inspections, etc. is desired.	
	Enter completed work orders and documentation of work completed			INFOR		AW		TBD	TBD		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Possibly perform condition inspections during work orders, establish criteria / training per asset	

STORMWATER DATA SYSTEM FUNCTION MATRIX

Function	Sub Function	Position (Title) Responsible for Managing and Implementing Sub Function	Source, Where Documented or Studied	Data Systems Utilized	Dept. with Primary Responsibility	Cross Departmental Coordination (Department)	Inner Departmental Coordination (Group/Division)	Level of Service (Level of Service shall be added as needed over time. Currently LOS has not been established for all functions)		Individuals with Notable Responsibility	Current Status	Known Gaps	Notes
								Existing	Target				
											☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Training for the "map drawer" functionality of INFOR was noted as a need.	
											☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		

Financial Management Division

Joe Ann Giddings, Manager

Function	Sub Function	Individuals with Notable Responsibility	Sub function Status	Known Gaps and Notes
EXPENDITURES				
Evaluate, Plan and Budget All Program Elements	Annually Evaluate & Plan Budgets for Program Elements for 1 Year, 5 Year and 20 Year Periods	Dan Mikesell	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	A gap is the lack of budgeting and tracking for all program elements. If budgeting and tracking was done by program element, expenditures for the program elements could be budgeted and prioritized based on the overarching goals and objectives. However, this would involve more accounting time and may involve staff tracking their time. The accounting categories currently track maintenance and capital costs out of the 8 program elements. Two types of capital accounts are included in capital; capital projects and capital expenditures for such things as equipment. Accounting for capital projects is by each individual project account. Accounting for maintenance is shown as one line item on the accounting reports. Staff costs make up a large percentage of costs for programs elements other than capital. Staff costs are currently projected by payroll. Each staff person's costs are projected by percentages for stormwater, water, and wastewater. This projection is done by managers at the beginning of the year or multiple years. Managers have 15% of their time allocated to stormwater. Most other staff working on stormwater are allocated 100% to stormwater, but time is not allocated to program elements.
	Planning	Sarah Young	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	
	Floodplain Administration	Bill McCormick	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	
	Capital Improvement	Steve Fiori	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	
	O&M	Joe McCleary	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	
	Asset Management	Greg Chol	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	
	Regulatory	Sean Lieske	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	
	Data Needs	Bill Keever	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	
	Financial Management			
Review Stormwater Expenditures to Other Departments	Evaluate PW Agreements and Costs, Including Street Sweeping, Street Overlay Program, Snow Removal, and Staff Time for Development Review.		☐ Functioning as Needed ☐ Needs Improvement ☑ Needs Further Study	The rationale for expenditures to other departments is not documented, which is a gap. Aurora Water/Stormwater has numerous expenditures for expenses that may not be considered consistent with the mission of Aurora Water and/or Stormwater. While there may be solid reasons for these expenditures, a document explaining why Aurora Water is paying for the identified share would clear up any questions to staff, Council and ratepayers. The expenditures identified for this evaluation are listed in a separate table titled "Payments by Aurora Water/Stormwater to Other Departments".
	Evaluate Other Expenditures such as: >Fire Hydrant Maintenance, >Pump Station Maintenance for Golf Courses, Sports Parks, and Hutchison Green Belt, >Public Information on Utility Bill Inserts, > Training Classes, > O & M of Irrigated Turf, >Irrigated Water for PROS & Golf, and >AEDC Support,		☐ Functioning as Needed ☐ Needs Improvement ☑ Needs Further Study	
Internal Budget	Manage/Budget Interdepartmental Manpower, Equipment and Other Resources Transfers		☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	Included in the gap above.
	Bill Other Departments for Work Performed		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Included in the gap above.
	Review Invoices and Manage Disbursement of Funds to Proper Accounts		☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	Included in the 2 gaps above.
Life Cycle Cost	Evaluate Life Cycle and Implementation Costs for Capital, Maintenance, and Asset Management		☐ Functioning as Needed ☐ Needs Improvement ☑ Needs Further Study	The major identified gap is the lack of a condition assessment for the City's stormwater system. The financial aspects of Life Cycle Cost will be added to this evaluation, but the overall work of Life Cycle Cost will be included in Asset Management. The Asset Management Function Matrix details the gaps within Asset Management.
REVENUES				
Fee Evaluation	Evaluate Adequacy of User Fees	Janet Klink	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	The most recent Fee Evaluation is included in the rate study completed by StepWise Utility Advisors completed in 2011. The rate study concluded that the rates and resulting revenues were adequate for the stormwater program at that time. It is suggested a rate study be incorporated into Phase 3 of this study.
	Evaluate Adequacy of Development Impact Fees		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	The current MWH study is reviewing the adequacy of development fees.
	Investigate Alternatives to Increase Fees, If Necessary	Dan Mikesell	☑ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	This may be completed in the periodic rate studies for stormwater, depending on the findings and scope of services for the rate studies. Refer to the technical memo title Impervious Area Based Rate Structure Options completed as part of this study.

Function	Sub Function	Individuals with Notable Responsibility	Sub function Status	Known Gaps and Notes
Administrate SW User Fees	Annually Update User Fee Database from County Assessor's Information and/or Water Billing Information		☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	New users are added to the billing database as they come in from engineering.
	Verify Information with County Assessor		☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	See Above
	Annually Add New Customers from Building Permit Records, if necessary.		☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	See Above
	Update Growing Coverage Area and Schedule Aerial Imagery when necessary		☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	See Above
	Create an Integrated and Updated Annual Billing Database from Above Sources		☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	See Above
	Furnish Updated Database to Billing Department		☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	See Above
	Provide Customer Service for Billing Issues		☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	
	Oversee Fund Collection from SW User Fees and Transfer to Appropriate Accounts		☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	
	Manage Collection of Late, Partial, and Non Payments		☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	
Development Impact Fees	Assess Impact Fees to new developments per building permits and other information		☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Added to billing database as new buildings come in from engineering.
	Revise Impact Fees to account for inflation and projects in new master plans		☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Currently underway by MHW study. This should be reviewed during Phase 3 of this study.
	Oversee Impact Fee Account for Collection and Placement in development fund accounts		☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	
Funding Options	Review Aurora Stormwater Program Additional Funding Options		☐ Functioning as Needed ☐ Needs Improvement ☑ Needs Further Study	This is completed in the Tech Memo titled Impervious Area Based Rate Structure Options which is part of this report.
Plan Review Fees	Consider Time Tracking for AW staff time and charging for Plan Reviews and associated expenses		☐ Functioning as Needed ☐ Needs Improvement ☑ Needs Further Study	This may be a gap if it is considered necessary.

Floodplain Management

Kevin Wegener, COA Floodplain Administrator

Function	Sub Function	Position (Title) Responsible for Managing and Implementing Sub Function	Data Systems Utilized	Dept. with Primary Responsibility	Cross Departmental Coordination (Department)	Inner Departmental Coordination (Group/Division)	Individuals with Notable Responsibility	Current Status	Known Gaps	Notes
Tracking CLOMRs & LOMRs	Receive CLOMR and LOMCs requests, log into AMANDA, track comments (UDFCD), and review for completeness	Floodplain Administrator, City Engineer (Kevin Wegener)	AMANDA, ArcGIS	PW	N/A	N/A	Associate City Engineer, Plans Review Section (Bill McCormick)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		JV: Source and level-of-service columns have been hidden, Known Gaps column should be hidden or deleted as well after Gap Analysis Tech Memo is vetted.
Pond Certifications	Certify Pond Design and Construction with PM	Associate City Engineer, Plans Review Section (Bill McCormick)	AMANDA	PW	AW	Public Improvements Inspections (PII)	Associate City Engineer, Plans Review Section (Bill McCormick)	☐ Needs Further Study ☐ Needs Improvement ☐ Needs Further Study		GVM: This item needs to be coordinated with the Regulatory Function Matrix and Gaps
Floodplain Determination	Check floodplain status at building permit application or per special request	Floodplain Administrator, City Engineer (Kevin Wegener)	FEMA Floodplain Maps, FIS (PW hard copies)	PW	N/A	N/A	Associate City Engineer, Plans Review Section (Bill McCormick)	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	An electronic process for tracking floodplain determinations needs to be set forth and responsibility/accountability established	Include FHADs, FEMA Studies and Other Studies, JV: Bill M. may have comments regarding the remaining gaps that will come in on the Gap Analysis Tech Memo which could change the 'Current Status' field from Needs Improvement to Functioning as Needed or Needs Further Study.
Elevation Certificates	Review Certificates and Track Approvals	Floodplain Administrator, City Engineer (Kevin Wegener)	N/A	PW	N/A	N/A	Associate City Engineer, Plans Review Section (Bill McCormick)	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	Current Gaps include lack of an electronic filing system for elevation certificates (currently hard copy only), and no documented process exists for checking new floodplain delineations to determine where new elevation certificates are needed for properties that have been added to the floodplain	In the past when Dfirms have placed properties into the floodplain there have been approximately 500-1000 elevation certificates prepared by the City on behalf of property owners.
Flood Response Plan	Coordinate Flood Response Plan with Fire Dept and FEMA	City Engineer (Kevin Wegener)	N/A	Emergency Operations Center (EOC)	EOC, AW	N/A	Special Projects Managers (Jim Brown, Steve Clark), Associate City Engineer, Plans Review Section (Bill McCormick)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		GVM: This item needs to be checked versus the City's emergency response plan for gaps and possibly discussed with Joe McCleary
Information Management	Provide floodplain and drainage related documents	Associate City Engineer, Plans Review Section (Bill McCormick)	Oracle, UDFCD Web Map, COA Website	PW	AW Engineering	PW Engineering	Senior Engineer (Craig Perl)	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	Documents for individual properties are hard to find on the City's primary website. This should be rectified. The system needs to be updated as currently documents after 1998 may be in the system, but previous documents are not. See also items above for other data related gaps.	O&M
CRS-Community Rating System	Verify FEMA CRS-Community Rating System	Manager of Water Operations and Maintenance (Tom Ries)	N/A	PW	AW Operations	N/A	Manager of Water Operations and Maintenance (Tom Ries), Stormwater Superintendent (Joe McCleary), Associate City Engineer, Plans Review Section (Bill McCormick)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		Suggested Addition by TAC

Master Planning

Sarah Young, Planning Services Manager

Function	Sub Function	Position (Title) Responsible for Managing and Implementing Sub Function	Data Systems & Software Utilized	Level of Service		Dept & Div. with Primary Responsibility (dept/div)	Cross Departmental Coordination (Department)	Inner Departmental Coordination (Group/Division)	Individuals with Notable Responsibility	Current Status	Known Gaps	Notes
				Existing	Target							
Manage Master Planning Program Element	Oversee All Planning Studies	Planning Services Manager	N/A	N/A	N/A	AW Planning	PW, Parks, Planning	AW Engineering, Project Delivery	Sarah Young	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		(COA) We should consider just making sure that the gaps are reflected in the Gap Analysis Tech Memo and focus these matrices on roles & responsibilities.
	Prioritize Planning Studies	" "	N/A	Annual	Annual	AW	None	" "	Kelly Neumann, Sarah Young	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	1. Studies are not ranked on economic/ social/ environmental factors.	
											3. Consider risk based planning when prioritizing studies	
											4. Consider setting level of service relative to risk and cost	
											5. Add new criteria developed for prioritizing planning studies.	
											6. Add parameters needed for the CIP prioritization study.	
	Manage ISWMP Preparation and Updates	Planning Services Manager	N/A		Bi-Annual (?)	AW Planning	PW Engineering	AW Engineering, Project Delivery	Sarah Young	☐ Functioning as Needed ☐ Needs Improvement ☑ Needs Further Study ☐ Functioning as Needed	Currently no ISWMP in place, Phase 2 underway, Phase 3 to be scheduled, and updates subsequently	(COA) We need to decide on a final name for the infrastructure plan (ISWMP/SWIMP?) and define acronyms (glossary table?) on Matrices where they appear.
	Define Conditions That Warrant New Studies Or Revision Of Existing	" "	SW Ops Maintenance Logs		Ongoing Evaluation	" "	" "	" "	Sarah Young, Kevin Wegener, Bill McCormick	☑ Needs Improvement ☐ Needs Further Study	Currently no defined conditions/criteria for revision of master plans(?)	
	Define Scope, Oversee Selection Of Consultant	" "	N/A		As-Needed	" "	PW Engineering, Purchasing Services	AW Engineering, Project Delivery, Business Services	Sarah Young	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study ☐ Functioning as Needed	Need standardized and consistent consultant rating process and spreadsheet.	(COA) These are very similar, may be better off combined? Also move to UDFCD & Specialty Design report sections, combine with relevant items there?
	Oversee RFP Process, Review Studies, Manage Referrals	" "	Historical consultant rating spreadsheets		As-Needed	" "	PW Engineering, Purchasing Services	" "	Sarah Young, RB Simmons	☐ Needs Improvement ☐ Needs Further Study	" "	" "
	Manage or Oversee Schedules, Budgets, and Reviews	" "	N/A		As-Needed	" "	Purchasing Services	" "	Sarah Young, Project Manager (As-Assigned)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		" "
	-									☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
Manage UDFCD & City Driven Master Plans (MDP, OSP, FHADs, etc.)	Requests And Reviews 5-Yr Proposed Planning Studies UDFCD	Planning Services Manager	N/A	Annual	Annual	AW Planning	PW Engineering	AW Engineering, Project Delivery, O&M	Sarah Young, Steve Fiori, Joe McCleary, Bill McCormick	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	No standard/defensible process and participants for selecting 5-year basin planning proposals.	
	Manage Budget And Schedule for Individual Studies	UDFCD Senior Project Manager, Master Planning	N/A	Ongoing	Ongoing	UDFCD	AW Planning & Engineering, PW Engineering	N/A	Shea Thomas	☐ Functioning as Needed ☐ Needs Improvement ☑ Needs Further Study	City may need to complete more studies and updates than the UDFCD budget allows. These studies would be funded and managed by the City. UDFCD may be able to manage some of these studies if they have available project managers.	
	Participate In Scoping And Consultant Selection	" "	N/A	As-Needed	As-Needed	" "	PW Engineering	AW Engineering, Project Delivery	" "	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Provide Public Involvement And Education	Public Relations Manager		None (?)	As-Needed	AW Public Relations?	N/A	AW Planning, Water Conservation?	Greg Baker	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	We don't currently do this with respect to master planning, to my knowledge.	
	Coordinate With Floodplain Administration	City Floodplain Administrator	N/A	As-Needed	As-Needed	PW Engineering	AW Planning & Engineering	N/A	Kevin Wegener, Bill McCormick	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Coordinate With MS4 Permit To Ensure Reqmts. Are In Plans	Regulatory Compliance Manager?	N/A	As-Needed	As-Needed	AW Regulatory Compliance	N/A	AW Planning, Engineering, Project Delivery, Regulatory Compliance	Sean Lieske	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	No established pipeline/process for MS4 review of UDFCD master plans.	
	Coordinates With 404 Permits For Location And Design Issues.	Project Delivery Services Manager and Project Manager (As-Assigned)	National Wetlands and Surface Waters Maps	As-Needed	As-Needed	AW Project Delivery	N/A	AW Planning, Engineering, Regulatory Compliance, O&M	Steve Fiori, Joe McCleary	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	No established pipeline/process for 404 review of UDFCD master plans.	Does UDFCD have a process or scope item for considering 404 issues during planning?
These aren't the people responsible for 'coordinating' per-se, but rather the key contacts.	Coordinate With O & M For Maintenance Related Design Issues.	Stormwater Superintendent	N/A	As-Needed	As-Needed	AW SW O&M	N/A	AW Planning, Engineering, Project Delivery	Joe McCleary	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	No established pipeline/process for O&M review of UDFCD master plans.	O&M is frequently called upon for information and review of basin master plans, but could be more integrally involved in review.
	Coordinate With Land Acquisition For Siting Issues.	Real Property Services Manager?	County Assessor's Database	As-Needed	As-Needed	PW Real Property	AW Planning & Engineering	N/A	Joani Cravens	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	This is something that doesn't seem to be very well coordinated and can result in missed opportunities, higher costs, etc.	
	Coordinates With Streets Department And CDOT	City Engineer	N/A	As-Needed	As-Needed	PW Engineering	CDOT, AW Planning & Engineering	N/A	Kevin Wegener	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	No designated CDOT contact for planning-related issues. ?	These issues are probably all being relayed through the PW rep for each UDFCD planning study (i.e. Bill McCormick).
	Coordinates With Parks And Open Space	PROS Principal Planner	N/A	As-Needed	As-Needed	PROS Planning	AW Planning & Engineering, PW Engineering	N/A	Curtis Bish	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	Coordination with Parks needs to be implemented earlier in the process of plans with which current or future Parks property is involved.	
	Coordinates With All Utilities	Misc Utility Reps	Public Utility Maps	As-Needed	As-Needed	Various	AW Planning & Engineering	N/A	Various	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		Coordination with outside utilities should be the responsibility of the master plan consultant?
	Regular Project Meetings To Review Work, Schedule, And Budget.	Planning Services Manager	N/A	As-Needed	As-Needed	AW Planning & Engineering	PW Engineering	N/A	Sarah Young	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		(COA) Repeat?
	Complete Draft Study For Review	UDFCD Senior Project Manager, Master Planning	Dropbox	As-Needed	As-Needed	UDFCD	AW Planning & Engineering, PW Engineering	N/A	Shea Thomas, AW Project Manager (As-Assigned)	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Revise Draft Report And Publish Final Report	" "	UDFCD Electronic Data Management Map	As-Needed	As-Needed	" "	N/A	N/A	Shea Thomas	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	~~Provides Asset Management Information To Study Team~~	~~Planning Services Manager~~	~~AW GIS SDE, Infor~~	~~As-Needed~~	~~As-Needed~~	~~AW Planning & Engineering~~	~~N/A~~	~~N/A~~	~~Sarah Young~~	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Provides Master Development Drainage Plans And Other Documents Related To Study Area To Study Team.	" "	AMANDA, AW Engineering Paper Files	As-Needed	As-Needed	" "	PW Engineering	N/A	Sarah Young	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	After Study is Completed Evaluate Master Plans and Generate List of Future CIP Projects, Enter into DMP	" "	ISWMP			AW	PW, AP	O&M	Sarah Young, Steve Fiori, Joe McCleary	☐ Functioning as Needed		We need to be sure that th
Manage Specialty Design Reports	Manage Special Design Reports	Engineering Services Manager	N/A	Ongoing	Ongoing	AW Planning & Engineering	PW Engineering?	AW Project Delivery Services	Vern Adam	☐ Needs Improvement ☐ Needs Further Study		
	Coordinates With Appropriate Departments	" "	N/A	As-Needed	As-Needed	" "	PW, PROS, Planning, ODA	AW Project Delivery Services, O&M, Regulatory, Business Services	" "	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Manage Budget And Schedule for Individual Studies	" "	N/A	Ongoing	Ongoing	" "	N/A	AW Project Delivery Services	" "	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Participate In Scoping And Consultant Selection	" "	Consultant Selection Spreadsheets	As-Needed	As-Needed	" "	PW Engineering	" "	" "	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Provide Public Involvement And Education	Public Relations Manager?		As-Needed	As-Needed	AW Public Relations?	N/A	AW Planning, Water Conservation?	Greg Baker	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	~~Coordinate With Floodplain Administration~~	~~City Floodplain Administrator~~	~~N/A~~	~~As-Needed~~	~~As-Needed~~	~~PW Engineering~~	~~AW Planning & Engineering~~	~~N/A~~	~~Bill McCormick~~	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		

Master Planning

Sarah Young, Planning Services Manager

Function	Sub Function	Position (Title) Responsible for Managing and Implementing Sub Function	Data Systems & Software Utilized	Level of Service		Dept & Div. with Primary Responsibility (dept/div)	Cross Departmental Coordination (Department)	Inner Departmental Coordination (Group/Division)	Individuals with Notable Responsibility	Current Status	Known Gaps	Notes
				Existing	Target							
	Coordinate With MS4 Permit To Ensure Reqmts. Are In Plans	Regulatory Compliance Manager?	N/A	As-Needed	As-Needed	AW Regulatory Compliance	N/A	AW Planning, Engineering, Project Delivery, Regulatory Compliance	Sean Lieske	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Coordinates With 404 Permits For Improvement Location And Design Issues.	Project Delivery Services Manager?	National Wetlands and Surface Waters Maps	As-Needed	As-Needed	AW Project Delivery	N/A	AW Planning, Engineering, Regulatory Compliance, O&M	Steve Fiori, Joe McCleary	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Coordinate With O & M For Maintenance Related Design Issues.	Stormwater Superintendent	N/A	As-Needed	As-Needed	AW SW O&M	N/A	AW Planning, Engineering, Project Delivery	Joe McCleary	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Coordinate With Land Acquisition For Siting Issues.	Real Property Services Manager?	County Assessor's Database	As-Needed	As-Needed	PW Real Property	AW Planning & Engineering	N/A	Joani Cravens	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Coordinates With Streets Department And CDOT	City Engineer	N/A	As-Needed	As-Needed	PW Engineering	CDOT, AW Planning & Engineering	N/A	Kevin Wegener	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Coordinates With Parks And Open Space	PROS Principal Planner	N/A	As-Needed	As-Needed	PROS Planning	AW Planning & Engineering, PW Engineering	N/A	Curtis Bish	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	~~Coordinates With All Utilities~~	~~Misc Utility Reps~~	~~Public Utility Maps~~	~~As-Needed~~	~~As-Needed~~	~~Various~~	~~AW Planning & Engineering~~	~~N/A~~	~~Various~~	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Regular Project Meetings To Review Work, Schedule, And Budget.	Engineering Services Manager	N/A	Ongoing	Ongoing	AW Planning & Engineering	PW Engineering	N/A	Vern Adam	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		(COA) Repeat - combine with item three in this section?
Manage IGA and Annexation Related Master Studies & Commitments	Coordinate With Planning and Public Works to Identify and Track IGA & Annex. Agreements	Planning Services Manager	IGA Tracking Spreadsheet		Ongoing	AW Planning & Engineering	PW Engineering, Real Property, Planning & Development	N/A	Planning Services Manager (Sarah Young)	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	IGA/Annexation agreement tracking process is poorly understood/documented.	
	Identify IGAs and Annexations with Master Planning Implications	" "	" "		Ongoing	" "	PW Engineering	N/A	" "	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Add Annexation and IGA Related Master Planning to Overall Prioritization	" "	" "		Ongoing (?)	" "	N/A	N/A	Kelly Neumann, Sarah Young	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
Provide Staffing Resources and Systems	~~Provide Staff Training~~	~~Planning Services Manager~~	~~N/A~~	~~Annual Plan~~	~~Annual Plan~~	~~AW Planning & Engineering~~	~~PW Engineering~~	~~AW Project Delivery, O&M~~	~~Sarah Young~~	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	~~Schedule Staff Activities~~	~~" "~~	~~N/A~~	~~Ongoing~~	~~Ongoing~~	~~" "~~	~~N/A~~	~~N/A~~	~~" "~~	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	~~Evaluate Staffing Needs and Track Staff Productivity~~	~~" "~~	~~N/A~~	~~Ongoing~~	~~Ongoing~~	~~" "~~	~~N/A~~	~~AW Project Delivery Services~~	~~" "~~	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	~~Provide Staff Supervision~~	~~" "~~	~~N/A~~	~~Weekly~~	~~Weekly~~	~~" "~~	~~PW Engineering~~	~~AW Project Delivery Services~~	~~Sarah Young, Bill McCormick~~	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	~~Manage HR Functions~~	~~" "~~	~~N/A~~	~~As-Needed~~	~~As-Needed~~	~~" "~~	~~N/A~~	~~Human Resources~~	~~Sarah Young, Sheri Martin~~	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	~~Establish Levels of Training for All Staff~~	~~" "~~	~~N/A~~	~~Annual~~	~~Annual~~	~~" "~~	~~N/A~~	~~AW Project Delivery Services~~	~~Kelly Neumann, Sarah Young, Steve Fiori~~	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
										☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		

Operations and Maintenance

Joe McCleary, Stormwater Superintendent

Function	Sub Function	Position (Title) Responsible for Managing and Implementing Sub Function	Where Documented or Studied	Data Systems Utilized	Level of Service		Dept. with Primary Responsibility	Cross Departmental Coordination (Department)	Inner Departmental Coordination (Group/Division)	Individuals with Notable Responsibility	Current Status	Known Gaps	Notes
					Existing	Target							
Maintain Conveyance Systems	Inspect and Maintain Open Channel Banks and Bottoms	SW Supervisors, note: Inspection done by OC, maintenance by SW	AW - PW MOU	Spreadsheet	80% of earthen channels (61 miles) and 100% of concrete channels (9 miles)	80% of earthen channels (61 miles) and 100% of concrete channels (9 miles)	AW-OPS UDFCD	N/A	OPS Compliance	Stormwater Superintendent (Joe McCleary), Environmental Inspection Coordinator (Geoff Rabinowitz)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		See UDFCD Meeting Notes, See Also Stream Management Plan, and Sedimentation Items Below
	Inspect & Maintain Public Conduits	SW Superintendent and SW Supervisors	AW - PW MOU AW Ops Plan 2013		not defined	not defined	AW-OPS	N/A	Stormwater Infrastructure CCTV and Manned Entry inspections, AW Engineering	Stormwater Superintendent (Joe McCleary)	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	The process for maintaining and inspecting these should be standardized (note that inspection is an Asset Management function)	CMP assessment completed, RCP assessment starts Nov 2014 and continues into future if funding approved
	Maintain Inlets and Flap Gates	SW Supervisors	AW-PW MOU, AW Ops Plan 2013		Inlets when needed, flap gates quarterly	Same	AW-OPS			Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Maintain Curbs, Gutters, and Sidewalks	Manager of Public Works Operations (Chris Carnahan)	AW - PW MOU				PW-STREETS OPS			Manager of Public Works Operations (Chris Carnahan)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Repair Crosspans and Inlet Transitions	PW Design Engineer (Raul Griego) and Stormwater Superintendent (Joe McCleary)	AW - PW MOU	tracked on PW spreadsheet	as needed and when budget permits		PW-STREETS OPS	PW	N/A	PW Design Engineer (Raul Griego) and Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Cross pans need to be added to the MOU	PW coordinates replacements, SW provides funding; coordinated with pavement improvement operations
	Maintain Chase Drains	SW & Streets Supervisors	AW - PW MOU	map books	as needed		PW-STREETS OPS	PW	N/A	Manager of Public Works Operations (Chris Carnahan), Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		SW responsibility if drains to a SW asset, otherwise PW responsibility
	Repair and Clean Inlet Boxes	SW Superintendent and SW Supervisors	AW-PW MOU, AW Ops Plan 2013		when inspections identify need	same	AW-OPS	PW	N/A	Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Clean Trash From Inlet Grates in Street	Streets responsibility as identified in MOU	AW - PW MOU, AW Ops Plan 2013				PW-STREETS	N/A	N/A	Manager of Public Works Operations (Chris Carnahan)	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study		
	Clean Culverts and Pipe Outlets in Ditches	SW supervisors	AW - PW MOU		not defined		AW-OPS	PW	N/A	Stormwater Superintendent (Joe McCleary)	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	Need to add to the Infor data a list of outfalls that require cleaning	
	Repair Roadside Ditch Riprap, Including Excavating Sediment and Debris		AW - PW MOU		As-needed		AW-OPS	PW-STREETS	N/A	Stormwater Superintendent (Joe McCleary)	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	Need to update MOU with additional clarification to define who is responsible for roadside ditches; Need tour to review field conditions	
	Maintain Private Conduits	Private Owner	AW - PW MOU				Private Owner	N/A	N/A	N/A	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	Need better process of establishing which conduits are City responsibility. Need to inform property owners of their responsibilities - (Joe M): GIS info often incorrect and private assets are identified as COA	Possibly by providing ownership field in GIS or other programs
	Maintain Bridge Components		AW - PW MOU				PW-STREETS OPS			Associate City Engineer (Bill McCormick), Manager of Public Works Operations (Chris Carnahan)	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study		
	Maintain Channels Under Bridges	SW superintendent and SW supervisors	AW - PW MOU	Infor	as needed		AW-OPS	PW	N/A	Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		SW activities coordinated with PW engineering
	Maintain Manholes in Streets	Manager of Water Operations and Maintenance (Tom Ries)	AW - PW MOU, & AW IP 2012	Infor	as needed		AW-T&D	N/A	AW-OPS	Stormwater Superintendent (Joe McCleary) and Water T&D Superintendent (Gary Edwards)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Does this need to be re-evaluated?	AW pays for or performs adjustment on water valves and manholes. AW pays part of inspections for util repairs
	Provide Snow Removal on Public Property	SW supervisors and other AW supervisors	AW - PW MOU, AW IP 2012	Infor	as needed		PW STREETS OPS, AW-OPS	PW	numerous	Manager of Public Works Operations (Chris Carnahan), Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Needs to be re-evaluated.	AW provides approx 40% of equipment and workforce to assist in snow removal. Parks provides snow removal on trails. See Aurora Water Snow Removal Policy.
	Provide Snow Removal on SW Property	SW supervisors	Snow Plan	Infor	as needed					Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Provide Street Sweeping	Manager of Public Works Operations (Chris Carnahan)	AW IP 2012				AW-OPS			PW Streets manages sweeping	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		Street sweeping with be fully funded by AW wastewater fund due to water quality requirements
	Maintain Drainage Easements and ROW	SW supervisors	AW-PW MOU, AW Ops Plan 2015	Infor	maintain 2x per year	same	AW-OPS		N/A	Stormwater Superintendent (Joe McCleary)	Functioning as needed		
Maintain Detention and Water Quality Control Features and Erosion Control	Initially Certify Private MS4 Permit Ponds (post construction)				When constructed		AW	PW	Regulatory	PW Engineering, AW Engineering	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		See flowchart for ponding certifications - Note, this item is also shown on the Regulatory FM.
	Annually Certify Private MS4 Permit Ponds	Environmental Inspection Coordinator (Geoff Rabinowitz)			Annually		AW		Regulatory		☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study		Note: This item is also shown on the Regulatory Function Matrix
	Maintain Public Detention Facilities	SW superintendent and SW supervisors	AW - PW MOU AW OPS Plan 2015	Infor	Monthly	same	AW	no	no		☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	SW staff receiving training about operation and maintenance required for permanent BMPs thru CSU SW Center	
	Prioritize Pond Maintenance Activities and Schedule Work	SW supervisors	Stormwater Organizational Chart, Meetings, AW OPS Plan 2015	Spreadsheet, Infor			AW		Regulatory, if MS4		☑ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study		
	Maintenance of Private Ponds	Private Owner								Environmental Inspection Coordinator (Geoff Rabinowitz)	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	Various gaps exist relative to private pond maintenance - owners don't know what their responsibilities are, inspection intervals have not been set, GIS system doesn't include all ponds and ownerships, and City Code doesn't include language providing for citation and fining owners for unmaintained facilities.	Current ordinance addresses ponds built after 2008 but is silent with respect to ponds built prior to that date.
	Inspect and Document Maintenance Needs Annually	SW superintendent and SW supervisors	Stormwater Organizational Chart, Meetings, AW OPS Plan 2015	Spreadsheet	continual		AW		Regulatory, if MS4		☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		(JV): Ensure that there aren't duplicates re: pond maintenance issues between this and the other FM's.

Operations and Maintenance

Joe McCleary, Stormwater Superintendent

		Position (Title) Responsible for Managing and Implementing Sub	Where ~~Documented or~~	Data Systems	Level of Service		~~L~~. with Primary ~~onsibility~~	~~s~~ Departmental ~~dination artment)~~	~~r~~ Departmental ~~dination up/Division)~~	Individuals with Notable			
Manage Stream Corridors (it may make more sense to develop an overall plan for stream corridors in general, then develop individual plans as specific problems are encountered)	Develop O&M Plan for Each Stream Corridor	SW Superintendent and SW Supervisors	Integrated Stream Management Plan (ISMP)				AW	UDFCD, PROS	N/A	Stormwater Superintendent (Joe McCleary)	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	The integrated Stream Management Plan stops short of identifying tasks to be performed and assigning responsibilities	Development of the O&M Plans for the ISMP were in Progress as of 2012. Progress needs to be updated
	~~Develop Pest Control Plans for Each Stream Corridor~~		~~ISMP~~								☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study		"
	~~Develop Tree Mitigation Plans for Each Corridor~~		~~ISMP, AW Ops Plan 2013~~								☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study		"
	~~Develop Wetlands Management Plan for Each Corridor~~		~~ISMP~~								☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	Need to add a layer for identified and mapped wetlands within the GIS system if it does not exist. A citywide wetlands survey may be warranted if it has not been completed.	"
	~~Develop Vegetation Plan for Each Corridor~~		~~ISMP~~								☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study		"
	~~Develop Wildlife Management Plan for Each Corridor~~		~~ISMP~~								☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study		"
	~~Develop Woody Management Plan~~		~~ISMP~~								☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study		"
	Execute O&M Plan Tasks for Each Stream Corridor	SW Superintendent and SW Supervisors	ISMP				AW OPS	UDFCD, PROS	N/A	Stormwater Superintendent (Joe McCleary)	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		Specific tasks need to be identified from the ISMP and information provided in columns to the left
	~~Execute Pest Control Tasks for Each Stream Corridor~~		~~ISMP~~								☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		"
	~~Execute Tree Mitigation Tasks for Each Corridor~~		~~ISMP~~								☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		"
	~~Execute Wetlands Management Tasks for Each Corridor~~		~~ISMP~~								☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		"
	~~Execute Vegetation Tasks for Each Corridor~~		~~ISMP~~								☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		"
	~~Execute Wildlife Management Tasks for Each Corridor~~		~~ISMP~~								☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		"
	~~Execute Woody Management Tasks for Each Corridor~~		~~ISMP~~								☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		"
Provide Spill Response Activities	Provide Spill Response Training	Environmental Permitting Manager (Sean Lieske)	Spill Response Information				AW			Environmental Inspection Coordinator (Geoff Rabinowitz)	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		(JV): This section needs to be checked with Sean L. and Geoff R. - spill response is a Regulatory function primarily as well, part of MS4 permit - move there?
	Respond to Spills in Accordance with Response Plan	Environmental Permitting Manager (Sean Lieske)	Spill Response Information				AW			Environmental Inspection Coordinator (Geoff Rabinowitz) and Operations Compliance Staff	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Provide Spill Record Keeping	Environmental Permitting Manager (Sean Lieske)	Spill Response Information				AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Meet Safety Requirements	All SW Staff	Spill Response Information				AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Update Spill Response Plan	Environmental Permitting Manager (Sean Lieske)					AW			Environmental Inspection Coordinator (Geoff Rabinowitz)	☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
Provide Sediment Management in Drainage Channels	Prioritize and Schedule Channel Inspections	Environmental Inspection Coordinator (Geoff Rabinowitz) and Stormwater Superintendent (Joe McCleary)	Sediment Management Plan (SMP), 2010		N/A	N/A	AW	N/A	OC	Environmental Inspection Coordinator (Geoff Rabinowitz) and Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		30% or greater blockage of culverts initiates inclusion on list for cleaning
	Provide Channel Inspections at Given Interval	Environmental Inspection Coordinator (Geoff Rabinowitz)	SMP 2010				AW	N/A	OC	Environmental Inspection Coordinator (Geoff Rabinowitz) and Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		(JM): Geoff R. needs to be consulted for any additional details of this sub-function (i.e. LOS).
	Document Channel Inspection Results	OC Staff, Environmental Inspection Coordinator (Geoff Rabinowitz), Stormwater Superintendent (Joe McCleary)	SMP 2010	SW Excel spreadsheet			AW	N/A	OC	Stormwater Superintendent (Joe McCleary) and OC Staff	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		(JM): Stormwater Ops developing a PDF inspection report form.
	Provide a Periodic Risk Assessment of Flooding due to Aggradation	Stormwater Superintendent (Joe McCleary) and Floodplain Manager (Kevin Wegener)	SMP 2010				AW	PW	AW Engineering	Associate City Engineer (Bill McCormick), Stormwater Superintendent (Joe McCleary), and Engineering Services Manager (Vacant)	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	(JV): There needs to be some discussion of the gaps related to this function in the Tech Memo.	(JM): This is a floodplain management function?
	Survey Aggradation Areas	Stormwater Superintendent (Joe McCleary) and Engineering Services Manager (Vacant)	SMP 2010				AW	PW Survey	AW Engineering	Stormwater Superintendent (Joe McCleary) and Engineering Services Manager (Vacant)	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	The City needs a stronger method for assessing vegetation and degradation/aggradation in channels, as well as a method for documenting planned and modeled vegetation for each channel.	
	Prioritize and Schedule Sediment Removal Projects	Stormwater Superintendent (Joe McCleary), Planning Services Manager (Sarah Young)					AW	PW	AW Engineering	Stormwater Superintendent (Joe McCleary), Associate City Engineer (Bill McCormick)	☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	Additional information is needed to develop future plans, activities have been scaled down to small sediment removal projects vs large sediment removal projects due to permitting issues.	
											☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		

Operations and Maintenance

Joe McCleary, Stormwater Superintendent

		Position (Title) Responsible for Managing and Implementing Sub	Where Documented or	Data Systems	Level of Service		t. with Primary onsibility	s Departmental dination artment)	r Departmental dination up/Division)	Individuals with Notable			
Provide Other Maintenance Activities	Provide Fall Protection	Stormwater Superintendent (Joe McCleary) and Stormwater Supervisors					AW	PW, PROS	N/A	Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	(JM): 30" drop within 30' of trail/sidewalk/etc.	
	Provide Graffiti Removal on Channels and Structures	Stormwater Superintendent (Joe McCleary) and Stormwater Supervisors	AW Ops Plan 2013		2x per week if needed	2x per week if needed	AW	APD, PROS	N/A	Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Install and Maintain Gates and Fences	Stormwater Superintendent (Joe McCleary) and Stormwater Supervisors	AW Ops Plan 2013		As-Needed	As-Needed	AW	PROS	N/A	Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	~~Provide a Periodic Risk Assessment of Flooding due to Aggradation~~		~~AW Ops Plan 2013~~								☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study		(JV/JM): This is a duplicate.
											☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
											☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
											☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
Critical Infrastructure Maintenance, Flap Gate & Erosion Control Maintenance	Levee System Certification	Stormwater Superintendent (Joe McCleary)	AW Ops Plan 2013				AW Supply Division's Dam Insp. Group	N/A	AW Engineering	Stormwater Superintendent (Joe McCleary), Engineering Services Manager (Vacant)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		Recertification of Sand Creek Levee required in 2020 activities related to recert should start in 2017
	Dam Maintenance for 3 Dam structures	Stormwater Superintendent (Joe McCleary) and Stormwater Supervisors	AW Ops Plan 2013		Monthly and after significant rain events	Monthly and after significant rain events	COA Stormwater Division	N/A	N/A	Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		(JV): Specify the '3 Dam Structures' (Southshore, Jewell, & Expo?)
	Flap Gate Maintenance for 11 Flap Gates	Stormwater Superintendent (Joe McCleary) and Stormwater Supervisors	AW Ops Plan 2013		Quarterly	Quarterly	COA Stormwater Division	N/A	N/A	Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Aurora-Owned Dam and Levee Inspection	Stormwater Superintendent (Joe McCleary)			Annually	Annually	AW	State	AW SOS: Cully	Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		
	Erosion Control for Maintenance Activities	Stormwater Superintendent (Joe McCleary)	AW Ops Plan 2013		As-Needed	As-Needed	COA Stormwater Division	N/A	N/A	Stormwater Superintendent (Joe McCleary)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		(JV): This is redundant with earlier erosion-control sub-function?
	Kelly Rd. Dam Inspections & Maintenance	Stormwater Superintendent (Joe McCleary) and Stormwater Supervisors	AW Ops Plan 2013	Infor	Monthly and Annual Inspections		COA SW	State, USACE	USACE, UDFCD, Lowry	Stormwater Superintendent (Joe McCleary), Water Maintenance Supervisor (Mike Earnest)	☑ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study		(JM): New sub-function since COA is sponsor, not owner of Kelly Rd (Lowry is) so handled differently.

Gaps Identified:

Per Phase 1 Study, Increase efficiency in inspections
Per Phase 1 Increase efficiency in data management
The City may want to consider combining several of the guidance documents sited herein

Regulatory Program Element Function Matrix

Jill Piatt-Kemper, Manager

Function	Sub Function	Position (Title) Responsible for Managing and Implementing Sub Function	Source, Where Documented or Studied	Data Systems Utilized	Level of Service		Dept. with Primary Responsibility	Cross Departmental Coordination (Department)	Inner Departmental Coordination (Group/Division)	Individuals with Notable Responsibility	Current Status	Known Gaps	EPA Recommendations	Notes
					Existing	Target								
Provide Resources and Systems Needed to Prepare and Update Documents Such as the MS4 Permit and Other Stormwater Regulations	Evaluate staff needs relative to the Regulatory Environment						AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	See EPA Audit for full explanation of "required corrective actions" which may be considered as gaps.	See EPA Audit for a full explanation of EPA Recommendations.	
	Purchase and Maintain Equipment Related to Regulations						AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	The deliverables from Phase 3 should present work flow options for achieving MS4 compliance, and sharing data with other agencies.		
	Provide Public education and outreach on stormwater impacts		EPA				AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	City needs to raise awareness regarding elements in the city code or policy related stormwater practices that the City may want to consider revising in order to facilitate a more effective overall stormwater program/business plan including recommendation regarding potential changes to City code that would address recurring issues with lot drainage, water quality, appearance and functionality of drainage facilities.	The City should evaluate the effectiveness of its outreach to the private development community and identify ways to more effectively promote the inclusion of LID BMPs in private development design proposals. (EPA Audit)	
	Organize and Manage Public Involvement/Participation		EPA				AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study			
	Respond to New Regulations, Permit Updates and Audits		EPA				AW	PW	OPS		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	The Aurora SWMP should address options for achieving compliance with future statewide and national regulations		
	Prepare and Update I & M Plans										☐ Functioning as Needed ☑ Needs Improvement ☐ Needs Further Study	I&M Plan template needs to be revised; lack of enforcement by the City for I&M plans not submitted; staff training about I&M plans needs to be conducted; pond certification process needs to be better defined; annual inspections are not being conducted; annual reports are not being submitted by the Responsible Party; enforcement of annual reports is not being conducted by the City	EPA Audit; Meeting with City Regulatory Staff on 8/27/14	
	Manages and coordinates 404 permits		AW SW Org Chart				AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study			
Provide Maintenance, Inspection and Reporting Related to Regulations	Initially Certify Private MS4 Permit Ponds (post construction)				When constructed		AW	PW	Regulatory	PW Engineering, AW Engineering				
	Annually Certify Private MS4 Permit Ponds	Environmental Inspection Coordinator (Geoff Rabinowitz)			Annually		AW		Regulatory					
	Respond to Illicit connections, spills, and discharge detection		AW SW Org Chart and EPA				AW	PW, AP	OPS		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Aurora would like (someday) to provide a GIS of basin/system/drainage connectivity between all elements to be able to track discharge		Meeting with City Regulatory Staff on 8/27/14
	Process Extension Agreements						AW	PW, AP			☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	Extension Agreements currently change too many hands and do not have one central storage location		Meeting with City Regulatory Staff on 8/27/14
	Provided Employee Training						AW				☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	City needs to provide sufficient employee training to help facilitate the implementation of spill response, illicit discharge detection, identification of non-stormwater discharges, etc.		Stormwater Awareness Training Presentation
	Document work that is being conducted on channels										☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	There are elements of work that is done on channels that is not currently tracked by Public Works		Meeting with City Regulatory Staff on 8/27/14
	Post-construction stormwater management in development/redevel.		EPA				AW	PW	OPS		☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study	I&M Plan template needs to be revised; lack of enforcement by the City for I&M plans not submitted; staff training about I&M plans needs	EPA Audit; Meeting with City Regulatory Staff on 8/27/14	
	Erosion Control Inspections		AW SW Org Chart	AW							☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study			
											☐ Functioning as Needed ☐ Needs Improvement ☐ Needs Further Study ☐ Needs Further Study			

Note: the minimum measures that didn't fit with existing Aurora functions listed on the AW SW Org Chart were listed under Jill Piatt-Kemper's responsibility. Some minimum measures were assigned to existing Aurora functions on a best fit basis, it is unknown if those Functions included all portions of that minimum measure. All of the tasks of the minimum measures are not listed, but will be included in the next version of this document.

5.0 Appendix B – Bibliography & Works Referenced

DOCUMENT TITLE	AUTHOR/OWNER
2010 Stormwater Master Plan Update; Castle Rock	Castle Rock; Castle Rock Water Engineering
2013 Maintenance Spreadsheet	City of Aurora
2014 Aurora Rain Watch Training Presentation	UDFCD
2014 Channel Inspection Log	City of Aurora
2014 Channel Inspection Summary Log	Aurora Water Stormwater/Wastewater Operations
2014 Stormwater Utility Survey	Black & Veatch; City of Aurora
2014-2017 Major Drainage Systems Master Planning Needs	UDFCD; City of Aurora
2015 CIP Wastewater Master	City of Aurora
2015 CIP Wastewater Master; 2015-2034 Storm Drain Capital Improvement Program (Proposed)	Aurora Water
2015 through 2018 Drainage Systems Master Planning Needs	Aurora Water Engineering
2015-2018 Master Planning Needs	City of Aurora; UDFCD
2015-2034 Storm Drain Capital Improvement Program	Aurora Water Engineering
All Pond Information (incomplete 05 19 14).xlsx	Aurora Water Stormwater/Wastewater Operations
All Pond Information for City of Aurora Boundaries (Private & Public)	Aurora Water Stormwater/Wastewater Operations
Assessment for Stormwater Assets	City of Aurora
Aurora Public Works Org Chart	Aurora Public Works Department
Aurora Stormwater Org Chart	Aurora Water
Aurora Water Asset Management Project; City of Aurora Stormwater CMP Assessment	Wilson/Aurora Water Engineering
Aurora Water Department Integration Planning, June 2012	Aurora Water
Aurora Water Department Stormwater Division Operational Plan 2013	Aurora Water
Aurora Water Department Stormwater Section Operational Plan (2015)	City of Aurora
Aurora Water Inspection & Maintenance Flowchart	City of Aurora
Aurora Water Rates Effective January 1, 2014	Aurora Water
Aurora Water Stormwater and Wastewater Operations Spill Response	City of Aurora
Authorization of Discharge Under the Colorado Discharge Permits System	City of Aurora
Authorization to Discharge Under the Colorado Discharge Permit System - City of Aurora (MS4)	CDPHE
City & County of Denver Storm Drainage Master Plan	City and County of Denver
City & County of Denver Storm Drainage Master Plan (2005)	City and County of Denver; UDFCD; Matrix Design Group

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

City & County of Denver Storm Drainage Master Plan (2009)	City and County of Denver; UDFCD; Matrix Design Group
City of Aurora Codes of Compliance	City of Aurora
City of Aurora Community Data Collection, SWMP Phase 1	URS/Aurora Water Engineering
City of Aurora Integrated Water Master Plan (IWMP)	City of Aurora
City of Aurora Integrated Water Master Plan (IWMP) Project Execution Plan	MWH/Aurora Water Engineering
City of Aurora Online Civil Plan Submittal & Review Pre-Submittal Checklist	Aurora Public Works Department
City of Aurora Phase I MS4 Program Inspection Findings Response	City of Aurora; US EPA
City of Aurora Rules and Regulations Regarding Stormwater Discharges Associated with Construction Activities	City of Aurora
City of Aurora September 2013 Flood Report	City of Aurora
City of Aurora Storm Drainage Design and Technical Criteria	Aurora Public Works Department
City of Aurora Stormwater CMP Assessment Recommended CIP Summary	Wilson/Aurora Water Engineering
City of Aurora Stormwater Program and Division Responsibilities	Aurora Water Engineering
City of Aurora; September 2013 Flood, Initial Report	City of Aurora
City of Grand Rapids, MI, Stormwater Asset Management and Capital Improvement Plan, May, 2013	City of Grand Rapids, MI
COA Storm Drainage & Technical Criteria	City of Aurora
Colorado Discharge Permit System, Fact Sheet for Modification No. 1 (Minor Modification), City of Aurora, CDPS Permit Number COS-000003, Adams County	CDPHE
Colorado Discharge Permit System, Municipal Stormwater Discharge Permit, Summary of Rationale, City of Aurora, Permit No. COS-000003	CDPHE
Compliance Related Record and Document Management System Model	City of Aurora IT Department
Copy of 2012 Channels List	Aurora Water
Data Systems 1 & 2	City of Aurora
Draft - Five-Year Capital Improvement Plan - 2013 through 2017	Urban Drainage and Flood Control District
Draft MS4 permit	CDPHE
EPA Flood Resilience Checklist	US EPA
Federal NPDES Stormwater Inspection - MS4, City of Aurora Phase I MS4 Inspection Report Colorado Discharge Permit System, Permit #: COS000003, Inspection Dates: August 8, 2012 - August 10, 2012	PG Environmental, LLC/US EPA
Final Report, Wastewater and Stormwater Rates For: The City of Aurora, Colorado	StepWise Utility Advisors/Aurora Water

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

Final Stormwater Master Plan, Phase 1	URS/Aurora Water Engineering
Five-Year Capital Improvement Plan – 2013 - 2017	Urban Drainage & Flood Control District
Flood Response Plan	Aurora Water
I & M Plan Template	City of Aurora
Instructions & Inspection and Maintenance Plan Template Appendix	Aurora Water
Memorandum of Understanding Between Aurora Water and Public Works Department – Responsibilities for Repair, Maintenance, and Improvements of Storm Drainage Infrastructure (2013)	Aurora Water and Aurora Public Works Department
Municipal Storm Water Inspection Report	City of Aurora
Ordinance No. 2013-52, A Bill, For an ordinance repealing and reenacting chapter 70 of the city code of the City of Aurora, Colorado, regarding floodplain damage prevention	City of Aurora
Phase 1 Stormwater Program Master Plan, Program Definition	URS Corporation
Public Works Department Administration Organizational Chart	Aurora Public Works Department
RCP Assessment Study (Full Report)	Aurora Water; Wilson & Company
Review of Asset Management and CIP Programs from other municipalities	Various
Service Level Agreement (SLA) between Aurora Water and Aurora Parks, Recreation and Open Space Department for Noxious Weed Management along Stream Corridors	Aurora water/Aurora PROS
Standards and Specifications: Water, Sanitary Sewer and Storm Drainage Infrastructure	Aurora Water Engineering
Storm Drain Capital Improvements Program 2013-2032	URS/Aurora Water Engineering
Stormwater Awareness Training	City of Aurora
Stormwater Division Operational Plan, 2013	Aurora Water Department
Stormwater GIS-Based Data & Information Management System	URS/Aurora Water Engineering
Stormwater Operations Sediment Management Plan (2010)	City of Aurora
Stormwater Wastewater Operations Compliance Division 2011 Annual Report	City of Aurora
Stormwater Wastewater Operations Compliance Division; 2012 Annual Report	City of Aurora
SW/WW Operations Spill Response Information Resource Folder	Aurora Water
UDFCD Master Plans, Database, & Maps	UDFCD
Urban Storm Drainage Criteria Manual	Urban Drainage & Flood Control District
URS Meeting Minutes Aurora Stormwater Program Master Plan Phase 1, Document Integration Workshop	URS/Aurora Water Engineering
US EPA Municipal Water Inspection Report (Final MS4)	City of Aurora; US EPA

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com

9090 S Ridgeline Blvd, Suite 105 Highlands Ranch, CO 80129 Corporate: (303) 730-0434 Fax: (303) 730-1139 www.calibre-engineering.com