



El Paso County MS4 Post Construction Detention / Water Quality Facility Documentation Form

This document **must be completed and submitted** with required attachments to the County for projects requiring a detention and/or a water quality facility. A separate completed form must be submitted for each facility.

Project name: Rolling Hills 2MG Potable Water Tank

Owner name: Widefield Water and Sanitation District

Location Address: TBD

Latitude and Longitude:

LAT: 38.777463, LONG: -104.621432

Assessor's Parcel #: 5500000385 Section: 1 Township: 15 S Range: 65 W

Expected Completion date: December 2021

Project acreage: 1.76 Design Ponding Acres: 0.074 Design Storm: 100-yr

Design Engineer Email Address: gdall@jdshydro.com

To ensure compliance with C.R.S. 37-92-602(8), the completed Stormwater Detention and Infiltration Design Data Sheet **must be attached**. The form can be found here: <https://maperture.digitaldataservices.com/gvh/?viewer=cswdif#> (click on Download SDI Design Data Sheet)

List all permanent water quality control measure(s) (EDBs, rain gardens, etc):
Sand Filter Basin

For all projects for which the constrained redevelopment sites standard is applied, provide an explanation of why it is not practicable to meet the full design standards. N/A

Attach Operations and Maintenance (O&M) Plan describing the operation and maintenance procedures that ensure the long-term observation, maintenance, and operation of control measure(s), including routine inspection frequencies and maintenance activities. If multiple, different water quality control measures are used at the same location, a separate O & M Plan must be provided for each facility.

Attach Private Detention Basin / Stormwater Quality Best Management Practice Maintenance Agreement and Easement addressing maintenance of BMPs that shall be binding on all subsequent owners of the permanent BMPs.

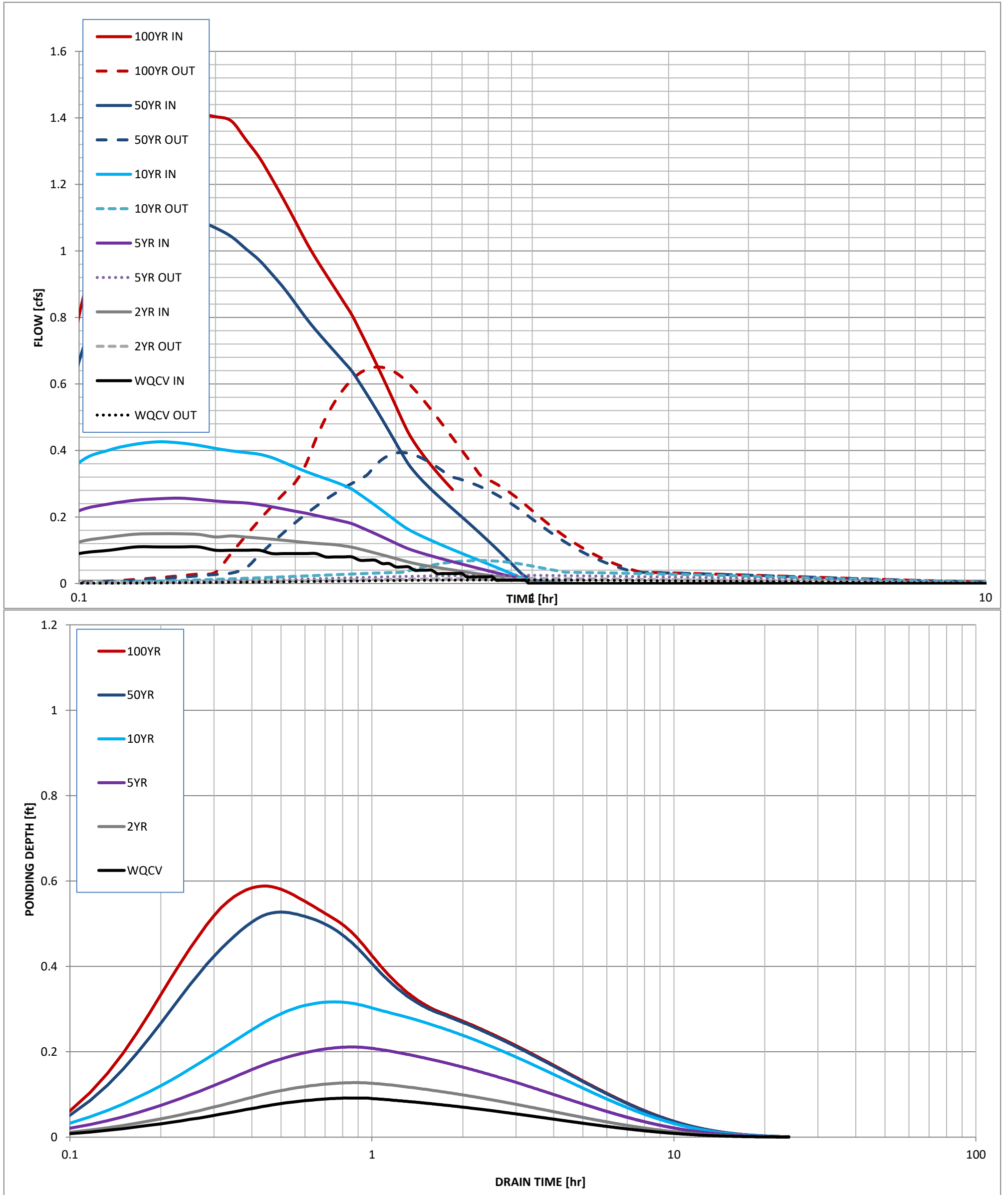
Attachments:

- Stormwater Detention and Infiltration Design Data Sheet
- O & M Plan
- Maintenance and Access Agreement

Review Engineer

EPC Project File No.

Stormwater Detention and Infiltration Design Data Sheet



**STORMWATER BEST MANAGEMENT PRACTICES
INSPECTION & MAINTENANCE PLAN (IM PLAN)**

for:

Rolling Hills 2MG Potable Water Tank

Located at:

***TBD
Colorado Springs, CO 80929***

**Prepared for and Party Responsible
for Maintenance and Inspection:**

***Widefield Water and Sanitation District
8495 Fontaine Blvd.
Colorado Springs, CO 80925***

Prepared by:

**JDS-Hydro Consultants, Inc.
5540 Tech Center Dr., Suite 100
Colorado Springs, CO 80919**



CONSULTANTS, INC.

**STORMWATER BEST MANAGEMENT PRACTICES
INSPECTION & MAINTENANCE PLAN (IM PLAN)
Widefield Water and Sanitation District
Rolling Hills 2MG Potable Water Tank**

Table of Contents

- I. Compliance with Stormwater Best Management Practices Maintenance Requirements**
- II. Inspection & Maintenance- Annual Reporting**
- III. Preventative Measures to Reduce Maintenance Costs**
- IV. Access and Easements**
- V. Safety**
- VI. Field Inspection Equipment**
- VII. Inspecting Stormwater Best Management Practices**
 - A. Inspection Procedures
 - B. Inspection Report
 - C. Verification of Inspection and Form Submittal
- VIII. Maintaining Stormwater Best Management Practices**
 - A. Maintenance Categories
 - B. Maintenance Personnel
 - C. Maintenance Forms

Appendices

- Appendix A** – General Location and Description of Stormwater Best Management Practices
- Appendix B** – Standard Operation Procedures (SOP)
- Appendix C** – Inspection Form
- Appendix D** – Maintenance Form
- Appendix E** – Erosion and Stormwater Quality Control Plan/As-Builts
- Appendix F** – PE Certification

<p>Reference: This plan is adapted from various maintenance manuals developed in the Colorado Front Range</p>

I. Compliance with Stormwater Best Management Practices Maintenance Requirements

All property owners are responsible for ensuring that stormwater best management practices (BMP's) or facilities installed on their property are properly maintained and that they function as designed. In some cases, this maintenance responsibility may be assigned to others through special agreements. The maintenance responsibility for a stormwater facility may be designated on the subdivision plat, the site development plan, and/or within a maintenance agreement for the property. Property owners should be aware of their responsibilities regarding stormwater facility maintenance and need to be familiar with the contents of this Inspection and Maintenance Plan (IM Plan). Maintenance agreement(s) associated with this property are provided.

II. Inspection & Maintenance – Annual Reporting

Requirements for the inspection and maintenance of stormwater facilities, as well as reporting requirements are included in this Stormwater BMP IM Plan.

Verification that the stormwater BMP's have been properly inspected and maintained: submittal of the required Inspection and Maintenance Forms shall be provided to El Paso County on an annual basis. The annual reporting form shall be provided to the County prior to May 31st of each year.

Copies of the Inspection and Maintenance forms are located in **Appendixes C & D**. Each form shall be reviewed and submitted by the property owner or property manager to the County.

III. Preventative Measures to Reduce Maintenance Costs

The most effective way to maintain your water quality facility is to prevent the pollutants from entering the facility. Common pollutants include sediment, trash & debris, chemicals, pet wastes, runoff from stored materials, illicit discharges into the storm drainage system and many others. A thoughtful maintenance program will include measures to address these potential contaminants and will save money and time in the long run. Key points to consider in your maintenance program include:

- Educate property owners/residents to be aware of how their actions affect water quality and how they can help reduce maintenance costs.
- Keep properties, streets and gutters, and parking lots free of trash, debris, and lawn clippings.
- Ensure the proper use, storage, and disposal of hazardous wastes and chemicals. Promptly clean up and spilled materials and dispose of properly.
- Plan lawn care to minimize and properly use chemicals and pesticides.
- Sweep paved surfaces and put the sweepings back on the lawn.
- Be aware of automobiles leaking fluids. Use absorbents such as cat litter to soak up drippings – dispose of properly.
- Encourage pet owners to clean up pet wastes.
- Re-vegetate disturbed and bare areas to maintain vegetative stabilization.
- Clean any private storm drainage system components, including inlets, storm sewers, and outfalls.
- Do not store materials outdoors (including landscaping materials) unless properly protected from runoff.

IV. Access and Right to Enter

All stormwater management facilities located on the site should have both a designated access location and the County has the right to enter for the purpose of inspecting and for maintaining BMP's where the owner has failed to do so.

V. Safety

Keep safety considerations at the forefront of inspection procedures at all times. Likely hazards should be anticipated and avoided. Never enter a confined space (outlet structure, manhole, etc.) without proper training, number of personnel, and equipment.

Potentially dangerous (e.g., fuel, chemicals, hazardous materials) substances found in the areas must be referred emergency services at 911 (non-emergency number is 444-7000). If a toxic or flammable substance is discovered, leave the immediate area and contact the local emergency services at 911.

Vertical drops may be encountered in areas located within and around the facility. Avoid walking on top of retaining walls or other structures that have a significant vertical drop. If a vertical drop is greater than 48" in height, make the appropriate note/comment on the maintenance inspection form.

If any hazard is found within the facility area that poses an immediate threat to public safety, contact emergency services at 911 immediately.

VI. Field Inspection Equipment

It is imperative that the appropriate equipment is taken to the field with the inspector(s). This is to ensure the safety of the inspector and allow the inspections to be performed as efficiently as possible. Below is a list of the equipment that may be necessary to perform the inspections of all stormwater BMP's:

- Protective clothing and boots
- Safety equipment (vest, hard hat, confined space entry equipment [if certified to perform confined space entry])
- Communication equipment
- IM Plan for the site
- Clipboard
- Stormwater BMP Inspection Form (See **Appendix C**)
- Manhole Lid Remover
- Shovel

Some of the items identified above need not be carried by the inspector (manhole lid remover, shovel, and confined space entry equipment), but should be available in the vehicle driven to the site. Specialized equipment may require specific training related to that equipment and should only be used by trained individuals.

VII. Inspecting Stormwater BMP's

The quality of stormwater entering the waters of the state relies heavily on the proper operation and maintenance of permanent BMP's. Stormwater BMP's must be periodically inspected to ensure that they function as designed. The inspection will determine the appropriate maintenance that is required for the facility.

A. Inspection Procedures

All Stormwater BMP's are required to be inspected a minimum of once per year. Inspections should follow the inspection guidance found in the SOP for the specific type of facility. (**Appendix B** of this manual).

B. Inspection Report

The person(s) conducting the inspection activities shall complete the appropriate inspection report for the specific facility. An Inspection Reports is located in **Appendix C**. A copy of each inspection form shall be kept by the owner a minimum of 5 years.

The following information explains how to fill out the Inspection Forms:

General Information

This section identifies the facility location, person conducting the inspection, the date and time the facility was inspected, and approximate days since the last rainfall. Property classification is identified as single-family residential, multi-family residential, commercial, or other.

The reason for the inspection is also identified on the form depending on the nature of the inspection. All facilities must be inspected on an annual basis at a minimum. In addition, all facilities should be inspected after a significant precipitation event to ensure the facility is draining appropriately and to identify any damage that occurred as a result of the increased runoff.

Inspection Scoring

For each inspection item, a score must be given to identify the urgency of required maintenance. The scoring is as follows:

- 0 = No deficiencies identified
- 1 = Monitor – Although maintenance may not be required at this time, a potential problem exists that will most likely need to be addressed in the future. This can include items like minor erosion, concrete cracks/spalling, or minor sediment accumulation. This item should be revisited at the next inspection
- 2 = Routine Maintenance Required – Some inspection items can be addressed through the routine maintenance program. This can include items like vegetation management or debris/trash removal
- 3 = Immediate Repair Necessary – This item needs immediate attention because failure is imminent or has already occurred. This could include items such as structural failure of a feature (outlet works, forebay, etc), significant erosion, or significant sediment accumulation. This score should be given to an item that can significantly affect the function of the facility.
- N/A = This is checked by an item that may not exist in a facility. Not all facilities have all of the features identified on the form (forebay, micro-pool, etc.).

Inspection Summary/Additional Comments

Additional explanations to inspection items, and observations about the facility not covered by the form, are recorded in this section.

Overall Facility Rating

An overall rating must be given for each facility inspected. The overall facility rating should correspond with the highest score (0, 1, 2, 3) given to any feature on the inspection form.

C. Verification of Inspection and Form Submittal

The Stormwater BMP Inspection Form provides a record of inspection of the facility. An Inspection Form is provided in **Appendix C**. Verification of the inspection of the stormwater facilities and the facility inspection form(s) shall be provided to the County on an annual basis. The verification and the inspection form(s) shall be reviewed and submitted by the property owner or property manager on behalf of the property owner.

Refer to Section II of this Manual regarding the annual reporting of inspections.

VIII. **Maintaining Stormwater BMP's**

Stormwater BMP's must be properly maintained to ensure that they operate correctly and provide the water quality treatment for which they were designed. Routine maintenance performed on a frequently scheduled basis, can help avoid more costly rehabilitative maintenance that results when facilities are not adequately maintained.

A. Maintenance Categories

Stormwater BMP maintenance programs are separated into three broad categories of work. The categories are separated based upon the magnitude and type of the maintenance activities performed. A description of each category follows:

Routine Work

The majority of this work consists of scheduled mowing and trash and debris pickups for stormwater management facilities during the growing season. This includes items such as the removal of debris/material that may be clogging the outlet structure well screens and trash racks. It also includes activities such as weed control, mosquito treatment, and algae treatment. These activities normally will be performed numerous times during the year. These items can be completed without any prior correspondence with the County; however, inspection and maintenance forms shall be completed with the information also being reported on the annual report forms that are submitted to the County.

Restoration Work

This work consists of a variety of isolated or small-scale maintenance and work needed to address operational problems. Most of this work can be completed by a small crew, with minor tools, and small equipment. These items do not require prior correspondence with the County, but do require that completed maintenance forms be submitted to the County with the annual report forms.

Rehabilitation Work

This work consists of large-scale maintenance and major improvements needed to address failures within the stormwater BMP. This work requires consultation with the County and may require an engineering design with construction plans to be prepared for review and approval by the County. This work may also require more specialized maintenance equipment, surveying, construction permits or assistance through private contractors and consultants. These items require prior correspondence with the County and require that completed maintenance forms be submitted to the County with the annual report forms.

B. Maintenance Personnel

Maintenance personnel should be qualified to properly maintain stormwater BMP's, especially for restoration or rehabilitation work. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs.

C. Maintenance Forms

The Stormwater BMP Maintenance Form provides a record of maintenance activities and includes general cost information to assist property owners in budgeting for future maintenance. A Maintenance Form is provided in **Appendix D**. Maintenance Form shall be completed by the property owner, management company, or contractor completing the required maintenance items. The form shall then be reviewed by the property owner or an authorized agent of the property owner and submitted on an annual basis by May 31st to the following address:

El Paso County – Development Services
2880 International Circle
Colorado Springs, CO 80910

Refer to Section II of this Manual regarding the annual reporting of inspections and maintenance activities performed.

Appendix A

General Location and Description of Stormwater Best Management Practices

A. General Site Description

The subject facility is a proposed water storage tank site to serve development in the Widefield Water and Sanitation District. The Rolling Hills Tank site is located south of Drennan Road and occupies part of the Northwest $\frac{1}{4}$ of Section 2, Township 15 South, Range 65 West of the 6th P.M within El Paso County, Colorado. The site is located within a grazing field bound by Drennan Road to the north, S. Meridian Road to the east, Bradley Road to the south, and a 415 foot utility easement to the west. The proposed site will consist of a 2MG concrete water storage tank, buried pipelines, above-grade electrical/control equipment, and a future 2-5MG water storage tank, 0.75-1.5MG elevated tank, and booster pump station when/if needed by the District. Additionally, an onsite access road will be constructed from aggregate base course material.

The total acreage of disturbed land for the construction of the facilities is approximately 2.18 acres. Soils for this project are delineated as Tassel fine sandy loam and are characterized as Hydrologic Soil Group D (high runoff potential when thoroughly wet).

B. General Stormwater Management Description

All stormwater is conveyed via drainage swale to a sand filter basin (SFB) located adjacent to the access road that provides 10/100 -yr detention and water quality treatment. The outfall for the detention basin discharges to the east of the detention basin into the East Fork Tributary drainage basin. The site is not impacted from off-site flows due to the site location being on top of a hill.

C. Stormwater Facilities Site Plan

Inspection or maintenance personnel may utilize the documents in Appendix F for locating the stormwater facilities within this development.

D. On-Site / Off-Site Stormwater Management Facilities

Rolling Hills Tank Site contains both temporary and permanent BMP's, with some temporary BMP's capable of becoming permanent if necessary. Permanent BMP's consist of an Sand Filter Basin (SFB) w/ outlet structure. The temporary BMP's incorporated in the design include silt fencing. Each facility is described in detail below:

Permanent BMP's

Sand Filter Basin w/ Outlet Structure

The SFB providing 10-/100-yr detention was designed to collect and detain stormwater, allowing only historic runoff flows to proceed downstream. Water Quality Control Volume (WQCV) was also designed into the SFB to improve water quality by providing adequate time for sediment to be filtered out in the basin before being released downstream. The

SFB provides an 18-inch layer of filter material with an underdrain system that discharges into the outlet structure with a 0.35-inch orifice plate on the 4-inch underdrain pipe. The SFB will allow for partial infiltration and the stormwater that does not infiltrate is collected and removed by the underdrain system.

An outlet structure was integrated in the SFB to release the WQCV, 10-yr, and 100-yr storm event. The outlet structure design was based on a drain time of 12 hours for the WQCV. The 100-yr release rate is based on a drain time of 90% of the historic flow. This structure is comprised of a sloped inlet concrete box with 3-inch circular orifice and overflow weir including an outlet pipe with 5-inch circular orifice plate. A 15-inch RCP outlet pipe discharges flows off-site and into the East Fork Tributary.

When storm events greater than the 10-year event occurs (or when an event occurs, and the orifice is plugged) water will enter the outlet structure via an inlet grate at the top. An orifice plate located on the outlet pipe from the structure will not allow greater than 90% of the 100-year historic flows to exit.

An emergency spillway conveys storm events greater than 100-yr over the embankment of the sand filter basin and released into the East Fork Tributary.

Temporary BMP's

Silt Fencing

Silt fencing is a temporary sediment barrier constructed of filter fabric stretched across supporting posts. The bottom edge of the fabric is entrenched and covered with backfill. Sediment must be periodically removed from behind the silt fence when it accumulates to half the fence height. Silt fencing shall be removed when adequate vegetative cover has been attained.

Appendix B

Standard Operating Procedures
for
Inspection and Maintenance

Sand Filter Basins (SFBs)

February 2021

Appendix B

Standard Operation Procedures
for
Inspection and Maintenance

Sand Filter Basins (SFBs)

May 2008



CITY OF COLORADO SPRINGS

TABLE OF CONTENTS

SFB-1 BACKGROUND3

SFB-2 INSPECTING SAND FILTER BASINS (SFBs)3

 SFB-2.1 ACCESS AND EASEMENTS.....3

 SFB-2.2 STORMWATER BEST MANAGEMENT PRACTICE (BMP) LOCATIONS3

 SFB-2.3 SAND FILTER EXTENDED DETENTION BASIN (SFB) FEATURES3

 SFB-2.3.1 Inflow Points/Splitter Box4

 SFB-2.3.2 Sedimentation Chamber4

 SFB-2.3.3 Filter Media5

 SFB-2.3.4 Underdrain System6

 SFB-2.3.5 Overflow Outlet Works6

 SFB-2.3.6 Embankments6

 SFB-2.3.7 Emergency Overflow.....7

 SFB-2.3.8 Miscellaneous7

 SFB-2.4 INSPECTION FORMS8

SFB-3 MAINTAINING SAND FILTER BASINS (SFBs)8

 SFB-3.1 MAINTENANCE PERSONNEL8

 SFB-3.2 EQUIPMENT8

 SFB-3.3 SAFETY9

 SFB-3.4 SFB MAINTENANCE FORMS9

 SFB-3.5 SFB MAINTENANCE CATEGORIES AND ACTIVITIES9

 SFB-3.6 ROUTINE MAINTENANCE ACTIVITIES9

 SFB-3.6.1 Mowing10

 SFB-3.6.2 Trash/Debris Removal10

 SFB-3.6.3 Splitter Box/Overflow Outlet Works Cleaning10

 SFB- 3.6.4 Woody Growth Control/Weed Removal10

 SFB-3.7 RESTORATION MAINTENANCE ACTIVITIES.....10

 SFB-3.7.1 Sediment Removal/Pollutant Removal.....11

 SFB-3.7.2 Erosion Repair12

 SFB-3.7.3 Jet-Vac/Clearing Drains13

 SFB-3.8 REHABILITATION MAINTENANCE ACTIVITIES13

 SFB-3.8.1 Major Sediment/Pollutant Removal.....14

 SFB-3.8.2 Major Erosion Repair14

 SFB-3.8.3 Structural Repair14

 SFB-3.8.4 SFB Rebuild.....14

SFB-1 BACKGROUND

Sand Filter Basins (SFBs) are a common type of stormwater best management practice (BMP) utilized within the Front Range of Colorado. A SFB consists of a sedimentation chamber, a flat surfaced area of sand (sometimes covered with grass or sod), a filtration chamber, and a flat sand filter bed with an underdrain system. A surcharge zone exists within the sedimentation and filtration chambers for temporary storage of the Water Quality Capture Volume (WQCV). During a storm, runoff enters the sedimentation chamber, where the majority of sediments are deposited. The runoff then enters the filtration chamber where it ponds above the sand bed and gradually infiltrates into the underlying sand filter, filling the void spaces of the sand. The underdrain gradually dewateres the sand bed and discharges the runoff to a nearby channel, swale, or storm sewer. SFBs provide for filtering and absorption of pollutants in the stormwater¹. The popularity of SFBs has grown because they allow the WQCV to be provided on a site that has little open area available for stormwater management. However, there are limitations on their use due to potential clogging from large amounts of sediment.

SFB-2 INSPECTING SAND FILTER BASINS (SFBs)

SFB-2.1 Access and Easements

Inspection and maintenance personnel may utilize the figures located in Appendix F containing the locations of the access points and potential maintenance easements of the SFBs within this development.

SFB-2.2 Stormwater Best Management Practice (BMP) Locations

Inspection and maintenance personnel may utilize the figures located in Appendix F containing the locations of the SFBs within this development.

SFB-2.3 Sand Filter Extended Detention Basin (SFB) Features

SFBs have a number of features that are designed to serve a particular function. Many times the proper function of one feature depends on another. It is important for maintenance personnel to understand the function of each of these features to prevent damage to any feature during maintenance operations. Below is a list and description of the most common features within a SFB and the corresponding maintenance inspection items that can be anticipated:

**TABLE SFB-1
Typical Inspection & Maintenance Requirements Matrix**

	Sediment Removal	Mowing Weed control	Trash/Debris Removal	Erosion	Overgrown Vegetation Removal	Removal/Replacement	Structure Repair
Inflow Points/Splitter Box	X		X				X
Sedimentation Chamber	X	X	X	X	X		
Filter Media	X	X	X	X	X	X	
Underdrain System	X					X	
Overflow Outlet Works	X		X				X
Embankment		X	X	X	X		

¹ Design of Stormwater Filtering Systems, Centers for Watershed Protection, December 1996

SFB-2.3.1 Inflow Points/Splitter Box

Inflow points or outfalls into SFBs are the point of stormwater discharge into the facility. An inflow point is commonly a curb cut with a concrete or riprap rundown or a storm sewer pipe outfall with a flared end section.

SFBs are designed to treat only the WQCV. The WQCV is a volume of water that runs off a site during an 80th percentile event. Any amount over the WQCV is allowed to go to the storm sewer system without water quality treatment. The splitter box is generally constructed of reinforced concrete. The splitter box typically has a lower wall that has a height that will trap the required WQCV. Volumes over the WQCV are allowed to spill over the wall and enter a storm sewer system that often conveys the runoff to a regional detention facility. Proper inspection and maintenance of the splitter box is essential in ensuring the long-term operation of the SFB.

An energy dissipater is typically immediately downstream of the splitter box, at the discharge point into the SFB, to protect the sedimentation and filtration chambers from erosion. In some cases, the splitter box outfall can have a toe-wall or cut-off wall immediately below the structure to prevent undercutting of the outfall from erosion.

The typical maintenance activities that are required at inflow points are as follows:

a. Riprap Displaced – Many times, because of the repeated impact/force of water, the riprap can shift and settle. If any portion of the riprap apron appears to have settled, soil is present between the riprap, or the riprap has shifted, maintenance may be required to ensure future erosion is prevented.

b. Sediment Accumulation – Because of the turbulence in the water created by the energy dissipater, sediment often deposits immediately downstream of the inflow point. To prevent a loss in performance of the upstream infrastructure, sediment that accumulates in this area must be removed on a timely basis.

c. Structural Damage – Structural damage can occur at anytime during the life of the facility. Typically for an inflow, the structural damage occurs to the pipe flared end section (concrete or steel). Structural damage can lead to additional operating problems with the facility, including loss of hydraulic performance.

SFB-2.3.2 Sedimentation Chamber

The sedimentation chamber is located adjacent to the splitter box and generally consists of a flat irrigated turf grass area followed by a water trapping device that allows water to be briefly held in the sedimentation chamber before being released into the filtration chamber. This slowing of the runoff allows sediments to be deposited in the sedimentation chamber and not the filtration chamber where they can cause clogging of the filter media.

The typical maintenance activities that are required within the sedimentation chamber are as follows:

a. Mowing/woody growth control/weeds present - Routine mowing of the turf grass within the sediment chamber is necessary to improve the overall appearance and to ensure proper function of the SFB. Turf grass should be mowed to a height of 2 to 4-inches and shall be bagged to prevent potential contamination of the filter media. If undesirable vegetation is not routinely mowed/removed, the growth can cause debris/sediment to accumulate, resulting in blockage of the filter media. Also, shrub,

grass and weed roots can cause damage to the filter media and underdrain system. Routine management is essential to prevent more extensive and costly future maintenance.

SBF-2.3.3 Filter Media

The filter media is the main pollutant removal component of the SFB. The filter media consists of 18-inches of washed sand. The filter media removes pollutants through several different processes, including sedimentation, filtration, infiltration and microbial uptake.

Sedimentation is accomplished by the slow release of stormwater runoff through the filter media. This slow release allows for sediment particles that were not deposited in the sedimentation chamber to be deposited on the top layer of the filter media where they are easily removed through routine maintenance. Other pollutants are also removed through this process because they are attached to sediment.

Filtration is the main pollutant removal mechanism of SFBs. When the stormwater runoff migrates down through the filter media, many of the particulate pollutants are physically strained out as they pass through the filter bed of sand and are trapped on the surface or among the pores of the filter media.

SFBs that are not lined with an impervious liner allow for infiltration into the native soils. This process also allows for additional pollutant removal.

Microbes that naturally occur in the filter media can assist with pollutant removal by breaking down organic pollutants.

The typical maintenance activities that are required within the filter media areas are as follows:

a. Mowing/woody growth control/weeds present - Noxious weeds and other unwanted vegetation must be treated as needed throughout the SFB. This activity can be performed either through mechanical means (mowing/pulling) or with herbicide. Consultation with a local Weed Inspector is highly recommended prior to the use of herbicide. Herbicides should be utilized sparingly and as a last resort. All herbicide applications should be in accordance with the manufacturer's recommendations.

b. Sediment/Pollutant Removal – Although SFBs should not be utilized in areas where large concentrations of sediment and other pollutants will enter the SFB, it is inevitable that some sediment and other pollutants will enter the SFB. Most sediment will be deposited in the sedimentation chamber, however finer suspended particles will migrate to the filter media. These sediments need to be removed to ensure proper infiltration rates of the stormwater runoff.

c. Filter Replacement - The top layers of the filter media are the most susceptible to pollutant loading and therefore may need to be removed and disposed of properly on a semi-regular basis when infiltration rates slow.

d. Infiltration Rate Test - An infiltration test may be necessary to ensure proper functioning of the filter media. The infiltration test can be conducted by filling the sand filter with water to the elevation of the overflow wall in the splitter box. The sand filter needs to drain completely within 40-hours of the filling. If the drain time for the basin is longer than 40-hours, the filter is in need of maintenance.

SFB-2.3.4 Underdrain System

The underdrain system consists of a layer of geotextile fabric, gravel storage area and perforated PVC pipes. The geotextile fabric is utilized to prevent the filter media from entering the underdrain system. The gravel storage area allows for storage of treated stormwater runoff prior to the discharge of the runoff through the perforated PVC pipe.

The typical maintenance activities that are required for the underdrain system are as follows:

With proper maintenance of the filter media and sediment chamber, there should be a minimum amount of maintenance required on the underdrain system. Generally, the only maintenance performed on the underdrain system is jet-vac cleaning.

SFB-2.3.5 Overflow Outlet Works

Some SFBs include an overflow outlet works in place of the splitter box. The overflow outlet works allows runoff amounts that exceed the WQCV to exit the SFB to the detention facility. The outlet works is typically constructed of reinforced concrete into the embankment of the SFB. The concrete structure typically has steel orifice plates anchored/embedded into it to control stormwater release rates. The larger openings (flood control) on the outlet structure typically have trash racks over them to prevent clogging. Proper inspection and maintenance of the outlet works is essential in ensuring the long-term operation of the SFB.

The typical maintenance activities that are required for the overflow outlet works are as follows:

a. Structural Damage - The overflow outlet structure is primarily constructed of concrete, which can crack, spall, and settle. The steel grate on the overflow outlet structure is also susceptible to damage.

b. Mowing/woody growth control/weeds present – The presence of plant material not part of the original landscaping, such as wetland plants or other woody growth, can clog the overflow outlet works during a larger storm event, causing flooding damage to adjacent areas. This plant material may indicate a clogging of the filter media and may require additional investigation.

SFB-2.3.6 Embankments

Some SFBs utilize irrigated turf grass embankments to store the WQCV.

The typical maintenance activities that are required for the embankments areas are as follows:

a. Vegetation Sparse – The embankments are one of the most visible parts of the SFB and, therefore, aesthetics is important. Adequate and properly maintained vegetation can greatly increase the overall appearance of the SFB. Also, vegetation can reduce the potential for erosion and subsequent sediment transport to the filter media, thereby reducing the need for more costly maintenance.

b. Erosion – Inadequate vegetative cover may result in erosion of the embankments. Erosion that occurs on the embankments can cause clogging of the filter media.

c. Trash/Debris – Trash and debris can accumulate in the upper area after large events, or from illegal dumping. Over time, this material can clog the SFB filter media and outlet works.

d. Mowing/woody growth control/weeds present – The presence of plant material not part of the original landscaping, such as wetland plants or other woody growth, can result in difficulty in performing maintenance activities. These trees and shrubs may also damage the underdrain system of the SFB. This plant material may indicate a clogging of the filter media and may require additional investigation.

SFB-2.3.7 Emergency Overflow

An emergency spillway is typical of all SFBs and designed to serve as the overflow in the event the volume of the pond is exceeded. The emergency spillway is typically armored with riprap (or other hard armor), and is sometimes buried with soil or may be a concrete wall or other structure. The emergency spillway is typically a weir (notch) in the basin embankment. Proper function of the emergency spillway is essential to ensure flooding does not affect adjacent properties.

The typical maintenance activities that are required for the emergency overflow areas are as follows:

a. Riprap Displaced – As mentioned before, the emergency spillway is typically armored with riprap to provide erosion protection. Over the life of an SFB, the riprap may shift or become dislodged due to flow.

b. Erosion Present – Although the spillway is typically armored, stormwater flowing through the spillway can cause erosion damage. Erosion must be repaired to ensure the integrity of the basin embankment, and proper function of the spillway.

c. Mowing/weed/woody growth control – Management of woody vegetation is essential in the proper long-term function of the spillway. Larger trees or dense shrubs can capture larger debris entering the SFB and reduce the capacity of the spillway. These trees and shrubs may also damage the underdrain system of the SFB.

d. Obstruction/Debris – The spillway must be cleared of any obstruction (man made or natural) to ensure the proper design capacity.

SFB-2.3.8 Miscellaneous

There are a variety of inspection/maintenance issues that may not be attributed to a single feature within the SFB. This category on the inspection form is for maintenance items that are commonly found in the SFB, but may not be attributed to an individual feature.

a. Access – Access needs to be maintained.

b. Graffiti/Vandalism – Vandals can cause damage to the SFB infrastructure. If criminal mischief is evident, the inspector should forward this information to the local emergency agency.

c. Public Hazards – Public hazards include items such as vertical drops of greater than 4-feet, containers of unknown/suspicious substances, and exposed metal/jagged concrete on structures. **If any hazard is found within the facility**

area that poses an immediate threat to public safety, contact the local emergency services at 911 immediately.

d. Other – Any miscellaneous inspection/maintenance items not contained on the form should be entered here.

SFB-2.4 Inspection Forms

SFB Inspection forms are located in Appendix C. Inspection forms shall be completed by the person(s) conducting the inspection activities. Each form shall be reviewed and submitted by the property owner or property manager to the City of Colorado Springs/Stormwater Team per the requirements of the Inspection and Maintenance Plan. These inspection forms shall be kept a minimum of 5 years and made available to the City of Colorado Springs upon request.

SFB-3 MAINTAINING SAND FILTER BASINS (SFBs)

SFB-3.1 Maintenance Personnel

Maintenance personnel should be qualified to properly maintain SFBs. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs.

SFB-3.2 Equipment

It is imperative that the appropriate equipment and tools are taken to the field with the operations crew. The types of equipment/tools will vary depending on the task at hand. Below is a list of tools, equipment, and material(s) that may be necessary to perform maintenance on a SFB:

- 1.) Mowing Tractors
- 2.) Trimmers (extra string)
- 3.) Shovels
- 4.) Rakes
- 5.) All Surface Vehicle (ASVs)
- 6.) Skid Steer
- 7.) Back Hoe
- 8.) Track Hoe/Long Reach Excavator
- 9.) Dump Truck
- 10.) Jet-Vac Machine
- 11.) Engineers Level (laser)
- 12.) Riprap (Minimum - Type M)
- 13.) Geotextile Fabric
- 14.) Erosion Control Blanket(s)
- 15.) Sod
- 16.) Illicit Discharge Cleanup Kits
- 17.) Trash Bags
- 18.) Tools (wrenches, screw drivers, hammers, etc)
- 19.) Confined Space Entry Equipment
- 20.) Approved Inspection and Maintenance Plan

21.) ASTM C-33 Sand

Some of the items identified above may not be needed for every maintenance operation. However, this equipment should be available to the maintenance operations crews should the need arise.

SFB-3.3 Safety

Vertical drops may be encountered in areas located within and around the SFB. Avoid walking on top of retaining walls or other structures that have a significant vertical drop. If a vertical drop is identified that is greater than 48-inches in height, make the appropriate note/comment on the maintenance inspection form.

SFB-3.4 SFB Maintenance Forms

The SFB Maintenance Form provides a record of each maintenance operation performed by maintenance contractors. The SFB Maintenance Form shall be filled out in the field after the completion of the maintenance operation. Each form shall be reviewed and submitted by the property owner or property manager to the City of Colorado Springs/Stormwater Team per the requirements of the Inspection and Maintenance Plan. The SFB Maintenance form is located in Appendix D.

SFB-3.5 SFB Maintenance Categories and Activities

A typical SFB Maintenance Program will consist of three broad categories of work: Routine, Minor and Major. Within each category of work, a variety of maintenance activities can be performed on a SFB. A maintenance activity can be specific to each feature within the SFB, or general to the overall facility. This section of the SOP explains each of the categories and briefly describes the typical maintenance activities for a SFB.

A variety of maintenance activities are typical of SFBs. The maintenance activities range in magnitude from routine trash pickup to the reconstruction of the SFB filter media or underdrain system. Below is a description of each maintenance activity, the objectives, and frequency of actions:

SFB-3.6 Routine Maintenance Activities

The majority of this work consists of scheduled mowings, trash and debris pickups for the SFB during the growing season. It also includes activities such as weed control. These activities normally will be performed numerous times during the year. These items typically do not require any prior correspondence with the City, however, completed inspection and maintenance forms shall be submitted to the City of Colorado Springs/Stormwater Team for each inspection and maintenance.

The Routine Maintenance Activities are summarized below, and further described in the following sections.

**TABLE SFB-2
Summary of Routine Maintenance Activities**

Maintenance Activity	Minimum Frequency	Look for:	Maintenance Action
Mowing	Twice annually	Excessive grass height/aesthetics	2"-4" grass height
Trash/Debris Removal	Twice annually	Trash/debris in SFB	Remove and dispose of trash and debris

Splitter Box/Overflow Outlet Works Cleaning	As needed - after significant rain events – twice annually minimum	Clogged outlet structure; ponding water	Remove and dispose of debris/trash/sediment to allow outlet to function properly
Woody growth control /Weed removal	Minimum twice annually	Noxious weeds; Unwanted vegetation	Treat w/herbicide or hand pull; consult a local Weed Inspector

SFB-3.6.1 Mowing

Routine mowing of the turf grass embankments and turf grass located in the sedimentation chamber is necessary to improve the overall appearance of the SFB and ensure proper performance of the sediment chamber. Turf grass should be mowed to a height of 2 to 4-inches and shall be bagged to prevent potential contamination of the filter media.

Frequency – Routine - Minimum of twice annually or depending on aesthetics.

SFB-3.6.2 Trash/Debris Removal

Trash and debris must be removed from the entire SFB area to minimize outlet clogging and to improve aesthetics. This activity must be performed prior to mowing operations.

Frequency – Routine – Prior to mowing operations and minimum of twice annually.

SFB-3.6.3 Splitter Box/Overflow Outlet Works Cleaning

Debris and other materials can clog the splitter box/overflow outlet work's grate. This activity must be performed anytime other maintenance activities are conducted to ensure proper operation.

Frequency - Routine – After significant rainfall event or concurrently with other maintenance activities.

SFB- 3.6.4 Woody Growth Control/Weed Removal

Noxious weeds and other unwanted vegetation must be treated as needed throughout the SFB. This activity can be performed either through mechanical means (mowing/pulling) or with herbicide. Consultation with a local County Weed Inspector is highly recommended prior to the use of herbicide. Herbicides should be utilized sparingly and as a last resort. All herbicide applications should be in accordance with the manufacturer's recommendations.

Frequency – Routine – As needed based on inspections.

SFB-3.7 Restoration Maintenance Activities

This work consists of a variety of isolated or small-scale maintenance/operational problems. Most of this work can be completed by a small crew, hand tools, and small equipment. These items do not require prior approval from the City.

Completed inspection and maintenance forms shall be submitted to City of Colorado Springs/Stormwater Team for each inspection and maintenance period. In the event that the SFB needs to be dewatered, care should be given to ensure sediment, filter material and other pollutants are not discharged. All dewatering activities shall be appropriately permitted.

**TABLE SFB-3
Summary of Restoration Maintenance Activities**

Maintenance Activity	Minimum Frequency	Look for:	Maintenance Action
Sediment/Pollutant Removal	As needed; typically every 1 –2 years	Sediment build-up in sedimentation chamber and filter media; decrease in infiltration rate	Remove and dispose of sediment
Erosion Repair	As needed, based upon inspection	Rills/gullies on embankments or sedimentation in the forebay	Repair eroded areas & revegetate; address cause
Jet-Vac/Cleaning Underdrains	As needed, based upon inspection	Sediment build-up /non-draining system	Clean drains; Jet-Vac if needed

SFB-3.7.1 Sediment Removal/Pollutant Removal

Sediment removal is necessary to ensure proper function of the filter media. The infiltration rate of the SFB needs to be checked in order to ensure proper functioning of the SFB. A SFB should drain completely within 12-hours of a storm event. If drain times exceed the 12-hour drain time then maintenance of the filter media shall be required.

At a minimum, the top 3-inches of filter media should be removed at each removal period. Additional amounts of filter media may need to be removed if deeper sections of the filter media are contaminated. New filter media will need to be placed back into the SFB when the total amount of sand removed reaches 9-inches. This may take multiple maintenance events to accomplish. It is critical that only sand that meets the American Society for Testing and Materials (ASTM) C-33 standard be utilized in the replacement of the filter media.

ASTM C-33 Sand Standard

US Standard Sieve Size (Number)	Total Percent Passing (%)
9.5 mm (3/8 inch)	100
4.75 mm (No. 4)	95-100
2.36 mm (No. 8)	80-100
1.18 mm (No. 16)	50-85
600 μ m (No. 30)	25-60
300 μ m (No. 50)	10-30
150 μ m (No. 100)	2-10

Other types of sand and soil material may lead to clogging of the SFB. The minor sediment removal activities can typically be addressed with shovels, rakes and smaller equipment. Major sediment removal activities will require larger and more specialized equipment. Extreme care should be taken when utilizing motorized or heavy equipment to ensure damage to the underdrain system does not occur. The major sediment removal activities will also require surveying with an engineer's level, and consultation with the City's Engineering staff to ensure design volumes/grades are achieved.

Stormwater sediments removed from SFBs do not meet the regulatory definition of "hazardous waste". However, these sediments can be contaminated with a wide array of organic and inorganic pollutants and handling must be done with care to ensure proper removal and disposal. Sediments should be transported by motor vehicle only after they are dewatered. All sediments must be taken to a licensed landfill for proper disposal. Should a spill occur during transportation, prompt and thorough cleanup and disposal is imperative.

Frequency – Non-routine – As necessary, based upon inspections. Sediment removal in the sedimentation chamber may be necessary as frequently as every 1-2 years.

SFB-3.7.2 Erosion Repair

The repair of eroded areas is necessary to ensure the proper functioning of the SFB, to minimize sediment transport, and to reduce potential impacts to other features. Erosion can vary in magnitude from minor repairs to filter media and embankments, to rills, and gullies in the embankments and inflow points. The repair of eroded areas may require the use of excavators, earthmoving equipment, riprap, concrete, and sod. Extreme care should be taken when utilizing motorized or heavy equipment to ensure damage to the underdrain

system does not occur. Major erosion repair to the pond embankments, spillways, and adjacent to structures will require consultation with the City's Engineering staff.

Frequency – Non-routine – As necessary, based upon inspections.

SFB-3.7.3 Jet-Vac/Clearing Drains

A SFB contains an underdrain system that allows treated stormwater runoff to exit the facility. These underdrain systems can develop blockages that can result in a decrease of hydraulic capacity and also create standing water. Many times the blockage to this infrastructure can be difficult to access and/or clean. Specialized equipment (jet-vac machines) may be necessary to clear debris from these difficult areas.

Frequency – Non-routine – As necessary, based upon inspections.

SFB-3.8 Rehabilitation Maintenance Activities

This work consists of larger maintenance/operational problems and failures within the stormwater management facilities. All of this work requires approval from the City's Engineering staff to ensure the proper maintenance is performed. This work requires that Engineering staff review the original design and construction drawings to assess the situation and assign the necessary maintenance activities. This work may also require more specialized maintenance equipment, design/details, surveying, or assistance through private contractors and consultants. In the event that the basin needs to be dewatered, care should be given to ensure sediment, filter material and other pollutants are not discharged. Proper permitting is required prior to any dewatering activity.

**TABLE SFB-4
Summary of Rehabilitation Maintenance Activities**

Maintenance Activity	Minimum Frequency	Look for:	Maintenance Action
Major Sediment/Pollutant Removal	As needed – based upon scheduled inspections	Large quantities of sediment in the sedimentation chamber and/or filter media; reduced infiltration rate /capacity	Remove and dispose of sediment. Repair vegetation as needed
Major Erosion Repair	As needed – based upon scheduled inspections	Severe erosion including gullies, excessive soil displacement, areas of settlement, holes	Repair erosion – find cause of problem and address to avoid future erosion
Structural Repair	As needed – based upon scheduled inspections	Deterioration and/or damage to structural components – broken concrete, damaged pipes & outlet works	Structural repair to restore the structure to its original design
SFB Rebuild	As needed – due to complete failure of SFB	Removal of filter media and underdrain system	Contact City Engineering

SFB-3.8.1 Major Sediment/Pollutant Removal

In very rare cases the filter media of the SFB may be contaminated so badly that the entire 18-inches of the filter media may need to be removed.

Major sediment/pollutant removal consists of removal of large quantities of sediment/filter media. Extreme care should be taken when utilizing motorized or heavy equipment to ensure damage to the underdrain system does not occur. The sediment/filter media needs to be carefully removed, transported and properly disposed. Vegetated areas need special care to ensure design volumes and grades are preserved or may need to be replaced due to the removal activities. Stormwater sediments removed from SFBs do not meet the regulatory definition of “hazardous waste”. However, these sediments can be contaminated with a wide array of organic and inorganic pollutants and handling must be done with care to insure proper removal and disposal. Sediments should be transported by motor vehicle only after they are dewatered. All sediments must be taken to a licensed landfill for proper disposal. Should a spill occur during transportation, prompt and thorough cleanup and disposal is imperative.

Frequency – Non-routine – Repair as needed, based upon inspections.

SFB-3.8.2 Major Erosion Repair

Major erosion repair consists of filling and revegetating areas of severe erosion. Determining the cause of the erosion as well as correcting the condition that caused the erosion should also be part of the erosion repair. Care should be given to ensure design grades and volumes are preserved. Extreme care should be taken when utilizing motorized or heavy equipment to ensure damage to the underdrain system does not occur.

Frequency – Non-routine – Repair as needed, based upon inspections.

SFB-3.8.3 Structural Repair

A SFB generally includes a splitter box or concrete overflow outlet structure that can deteriorate or be damaged during the service life of the facility. These structures are constructed of steel and concrete that can degrade or be damaged and may need to be repaired or re-constructed from time to time. Major repairs to structures may require input from a structural engineer and specialized contractors. Consultation with the City’s Engineering staff shall take place prior to all structural repairs.

Frequency – Non-routine – Repair as needed, based upon inspections.

SFB-3.8.4 SFB Rebuild

In very rare cases a SFB may need to be rebuilt. Generally, the need for a complete rebuild is a result of improper construction, improper maintenance resulting in structural damage to the underdrain system, or extensive contamination of the SFB. Consultation with the City’s Engineering staff shall take place prior to any rebuild project.

Frequency – Non-routine – As needed, based upon inspections.

APPENDIX C

SAND FILTER BASIN (SFB) INSPECTION FORM

Date: _____

Inspector: _____

Subdivision/Business Name: _____

Subdivision/Business Address: _____

Weather: _____

Date of Last Rainfall: _____ Amount: _____ Inches

Property Classification: Residential Multi Family Commercial Other: _____
(Circle One)

Reason for Inspection: Routine Complaint After Significant Rainfall Event
(Circle One)

INSPECTION SCORING – For each facility inspection item, insert one of the following scores:
 0 = No deficiencies identified 2 = Routine maintenance required
 1 = Monitor (potential for future problem) 3 = Immediate repair necessary
 N/A = Not applicable

FEATURES

1.) Inflow Points/Splitter Box

- ___ Riprap Displaced
- ___ Sediment Accumulation
- ___ Structural Damage (pipe, end-section, etc.)
- ___ Trash/Debris

2.) Sedimentation Chamber

- ___ Mowing/weed/woody growth control
- ___ Erosion Present
- ___ Trash/Debris
- ___ Sediment Accumulation

3.) Filter Media

- ___ Mowing/weed/woody growth control
- ___ Sediment/Pollutant Removal
- ___ Filter Replacement
- ___ Infiltration Rate Check

4.) Underdrain System

- ___ Evidence of clogged system
(jet-vac cleaning required)

5.) Outlet Works

- ___ Structural Damage (concrete, steel, subgrade)
- ___ Mowing/weed/woody growth control

6.) Embankments

- ___ Vegetation Sparse
- ___ Erosion Present
- ___ Trash/Debris
- ___ Mowing/weed/woody growth control

7.) Emergency Overflow

- ___ Riprap Displaced
- ___ Erosion Present
- ___ Woody Growth/Weeds Present
- ___ Obstruction/Debris

8.) Miscellaneous

- ___ Encroachment in Easement Area
- ___ Graffiti/Vandalism
- ___ Public Hazards
- ___ Other

Inspection Summary / Additional Comments: _____

OVERALL FACILITY RATING (Circle One)

- | | |
|---|----------------------------------|
| 0 = No Deficiencies Identified | 2 = Routine Maintenance Required |
| 1 = Monitor (potential for future problem exists) | 3 = Immediate Repair Necessary |

This inspection form shall be kept a minimum 5 years and made available to the County upon request.

APPENDIX D

SAND FILTER BASIN (SFB)			
MAINTENANCE FORM			
Subdivision/Business Name: _____	Completion Date: _____		
Subdivision/Business Address: _____	Contact Name: _____		
Maintenance Category:	Routine	Restoration	Rehabilitation
(Circle All That Apply)			
Reason for Inspection:	Routine	Complaint	After Significant Rainfall Event
(Circle One)			
MAINTENANCE ACTIVITIES PERFORMED			
<u>ROUTINE WORK</u>			
____ MOWING			
____ TRASH/DEBRIS REMOVAL			
____ OUTLET WORKS CLEANING (TRASH RACK/WELL SCREEN)			
____ WEED CONTROL (HERBICIDE APPLICATION)			
<u>RESTORATION WORK</u>		<u>REHABILITATION WORK</u>	
____ SEDIMENT REMOVAL		____ SEDIMENT REMOVAL (DREDGING)	
____ INFLOW POINT/SPLITTER BOX		____ FILTER MEDIA	
____ OUTLET WORKS		____ SEDIMENTATION CHAMBER	
____ FILTER MEDIA		____ EROSION REPAIR	
____ SEDIMENTATION CHAMBER		____ INFLOW POINT/SPLITTER BOX	
____ EMERGENCY OVERFLOW		____ OUTLET WORKS	
____ EROSION REPAIR		____ EMBANKMENTS	
____ INFLOW POINTS/SPLITTER BOX		____ SEDIMENTATION CHAMBER	
____ OUTLET WORKS		____ EMERGENCY OVERFLOW	
____ EMBANKMENTS		____ FILTER MEDIA	
____ SEDIMENTATION CHAMBER		____ STRUCTURAL REPAIR	
____ EMERGENCY OVERFLOW		____ INFLOW POINT/SPLITTER BOX	
____ FILTER MEDIA		____ OUTLET WORKS	
____ VEGETATION REMOVAL/TREE THINNING		____ FILTER MEDIA	
____ INFLOW(S)		____ SEDIMENTATION CHAMBER	
____ TRICKLE CHANNEL		____ EMERGENCY OVERFLOW	
____ UPPER STAGE		OTHER _____	
____ BOTTOM STAGE		_____	
____ REVEGETATION		_____	
____ JET-VAC/CLEARING DRAINS		_____	
____ INFLOWS		_____	
____ OUTLET WORKS		_____	
____ UNDERDRAIN		_____	

ESTIMATED TOTAL MANHOURS: _____
COSTS INCURRED (include description of costs): _____
EQUIPMENT/MATERIAL USED (include hours of equipment usage and quantity of material used): _____ _____
COMMENTS/ADDITIONAL INFO: _____ _____
This Maintenance Activity Form shall be kept a minimum of 5 years and made available to the County upon request.

Appendix E
As-Built Plans
(When Complete)

Appendix F
Civil Engineer
Stormwater Best Management Practice (permanent) Certification
Letter

02/08/2021

Attn.: EPC Review Engineer

To Whom it May Concern:

The permanent stormwater Best Management Practices (BMPs) for *Widefield Water and Sanitation District – Rolling Hills 2MG Potable Water Storage Tank south of Drennan Road in Colorado Springs, CO* consist of *silt fencing, revegetation and mulching, and a sand filter basin.*

JDS-Hydro Consultants, Inc. has reviewed the site to ensure it is in compliance with the approved BMP's for this project. Based upon this information and information gathered during periodic site visits to the project during significant/key phases of the stormwater BMP installation, *JDS-Hydro* is of the opinion that the stormwater BMPs have been constructed in general compliance with the approved Erosion and Stormwater Quality Control Plan, Construction Plans, and Specifications as filed with the County.

Statement Of Engineer In Responsible Charge:

I, Gwen J. Dall, a registered Professional Engineer in the State of Colorado, in accordance with Sections 5.2 and 5.3 of the Bylaws and Rules of the State Board of Registration for Professional Engineers and Professional Land Surveyors, do hereby certify that I or a person under my responsible charge periodically observed the construction of the above mentioned project. Based on the on-site field observations and review of pertinent documentation, it is my professional opinion that the required permanent BMPs have been installed and are in general compliance with the approved Erosion and Stormwater Quality Control Plan, Construction Plans, and Specifications as filed with the of County. For BMPs with a Water Quality Capture Volume (WQCV), I have attached the post-construction As-Built drawings. The As-Built drawings accurately depict the final installation of the stormwater BMPs and verify the WQCV.

Gwen J Dall, P.E.
Colorado No. 51810

Seal & Signature

**PRIVATE DETENTION BASIN /
STORMWATER QUALITY BEST MANAGEMENT PRACTICE
MAINTENANCE AGREEMENT AND EASEMENT**

This PRIVATE DETENTION BASIN / STORMWATER QUALITY BEST MANAGEMENT PRACTICE MAINTENANCE AGREEMENT AND EASEMENT (Agreement) is made by and between EL PASO COUNTY by and through THE BOARD OF COUNTY COMMISSIONERS OF EL PASO COUNTY, COLORADO (Board or County) and WIDEFIELD WATER AND SANITATION DISTRICT (District/Owner). The above may occasionally be referred to herein singularly as “Party” and collectively as “Parties.”

Recitals

A. WHEREAS, Owner is the owner of certain real estate (the Property) in El Paso County, Colorado, which Property is legally described in Exhibit A attached hereto and incorporated herein by this reference; and

B. WHEREAS, District desires to develop on the Property a land use to be known as Rolling Hills Tank; and

C. WHEREAS, the development of this Property will increase the volume of water runoff and will decrease the quality of the stormwater runoff from the Property, and, therefore, it is in the best interest of public health, safety and welfare for the County to condition approval of this land use on District’s promise to construct adequate stormwater quality structural Best Management Practices (“BMPs”) for the land use; and

D. WHEREAS, Chapter 8, Section 8.4.5 of the El Paso County Land Development Code, as periodically amended, promulgated pursuant to Section 30-28-133(1), Colorado Revised Statutes (C.R.S.), requires the County to condition approval of all subdivisions on a developer’s promise to so construct adequate drainage, water runoff control facilities, and BMPs in subdivisions; and

E. WHEREAS, the Drainage Criteria Manual, Volume 2, as amended by Appendix I of the El Paso County Engineering Criteria Manual (ECM), as each may be periodically amended, promulgated pursuant to the County’s Colorado Discharge Permit System General Permit (MS4 Permit) as required by Phase II of the National Pollutant Discharge Elimination System (NPDES), which MS4 Permit requires that the County take measures to protect the quality of stormwater from sediment and other contaminants, requires subdividers, developers, landowners, and owners of facilities located in the County’s rights-of-way or easements to provide adequate permanent stormwater quality BMPs with new development or significant redevelopment; and

F. WHEREAS, Section 2.9 of the El Paso County Drainage Criteria Manual provides for a developer’s promise to maintain a subdivision’s drainage facilities in the event the County does not assume such responsibility; and

G. WHEREAS, developers in El Paso County have historically chosen water runoff detention basins as a means to provide adequate drainage and water runoff control in subdivisions,

which basins, while effective, are less expensive for developers to construct than other methods of providing drainage and water runoff control; and

H. WHEREAS, District desires to construct for the land use one (1) detention basin/stormwater quality BMP(s) (“detention basin/BMP(s)”) as the means for providing adequate drainage and stormwater runoff control and to meet requirements of the County’s MS4 Permit, and to operate, clean, maintain and repair such detention basin/BMP(s); and

I. WHEREAS, District shall be charged with the duties of constructing, operating, maintaining and repairing the detention basin/BMP(s) on the portion of the Property described in [Exhibit A](#); and

J. WHEREAS, it is the County’s experience that subdivision developers and property owners historically have not properly cleaned and otherwise not properly maintained and repaired these detention basins/BMPs, and that these detention basins/BMPs, when not so properly cleaned, maintained, and repaired, threaten the public health, safety and welfare; and

K. WHEREAS, the County, in order to protect the public health, safety and welfare, has historically expended valuable and limited public resources to so properly clean, maintain, and repair these detention basins/BMPs when developers and property owners have failed in their responsibilities, and therefore, the County desires the means to recover its costs incurred in the event the burden falls on the County to so clean, maintain and repair the detention basin/BMP(s) serving this land use due to the District’s failure to meet its obligations to do the same; and

L. WHEREAS, the County conditions approval of this land use on the District’s promise to so construct the detention basin/BMP(s) and to reimburse the County in the event the burden falls upon the County to so clean, maintain and/or repair the detention basin/BMP(s) serving this land use; and

M. WHEREAS, the County could condition land use approval on the District’s promise to construct a different and more expensive drainage, water runoff control system and BMPs than those proposed herein, which more expensive system would not create the possibility of the burden of cleaning, maintenance and repair expenses falling on the County; however, the County is willing to forego such right upon the performance of District/Owner’s promises contained herein; and

N. WHEREAS, the County, in order to secure performance of the promises contained herein, conditions approval of this land use upon the Owner’s grant herein of a perpetual Easement over a portion of the Property for the purpose of allowing the County to periodically access, inspect, and, when so necessary, to clean, maintain and/or repair the detention basin/BMP(s).

Agreement

NOW, THEREFORE, in consideration of the mutual Promises contained herein, the sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. Incorporation of Recitals: The Parties incorporate the Recitals above into this Agreement.

2. Covenants Running with the Land: District/Owner agrees that this entire Agreement and the performance thereof shall become a covenant running with the land, which land is legally described in [Exhibit A](#) attached hereto, and that this entire Agreement and the performance thereof shall be binding upon itself, its successors and assigns.

3. Construction: District shall construct on that portion of the Property described in [Exhibit A](#) attached hereto and incorporated herein by this reference, one (1) detention basin/BMP(s). District shall not commence construction of the detention basin/BMP(s) until the El Paso County Planning and Community Development Department (PCD) has approved in writing the plans and specifications for the detention basin/BMP(s) and this Agreement has been signed by all Parties and returned to the PCD. District shall complete construction of the detention basin/BMP(s) in substantial compliance with the County-approved plans and specifications for the detention basin/BMP(s). Failure to meet these requirements shall be a material breach of this Agreement, and shall entitle the County to pursue any remedies available to it at law or in equity to enforce the same. Construction of the detention basin/BMP(s) shall be substantially completed within one (1) year (defined as 365 days), which one year period will commence to run on the date the approved plat of this Subdivision is recorded in the records of the El Paso County Clerk and Recorder. In cases where a subdivision is not required, the one year period will commence to run on the date the Erosion and Stormwater Quality Control Permit (ESQCP) is issued. Rough grading of the detention basin/BMP(s) must be completed and inspected by the El Paso County Planning and Community Development Department prior to commencing road construction.

In the event construction is not substantially completed within the one (1) year period, then the County may exercise its discretion to complete the project, and shall have the right to seek reimbursement from the District and its successors and assigns for its actual costs and expenses incurred in the process of completing construction. The term actual costs and expenses shall be liberally construed in favor of the County, and shall include, but shall not be limited to, labor costs, tool and equipment costs, supply costs, and engineering and design costs, regardless of whether the County uses its own personnel, tools, equipment and supplies, etc. to correct the matter. In the event the County initiates any litigation or engages the services of legal counsel in order to enforce the Provisions arising herein, the County shall be entitled to its damages and costs, including reasonable attorney fees, regardless of whether the County contracts with outside legal counsel or utilizes in-house legal counsel for the same.

4. Maintenance: The District agrees for itself and its successors and assigns that it will regularly and routinely inspect, clean and maintain the detention basin/BMP(s) and otherwise keep the same in good repair, all at its own cost and expense. No trees or shrubs that will impair the structural integrity of the detention basin/BMP(s) shall be planted or allowed to grow on the detention basin/BMP(s).

5. Creation of Easement: Owner hereby grants the County a non-exclusive perpetual easement upon and across that portion of the Property described in Exhibit A. The purpose of the easement is to allow the County to access, inspect, clean, repair and maintain the detention basin/BMP(s); however, the creation of the easement does not expressly or implicitly impose on the County a duty to so inspect, clean, repair or maintain the detention basin/BMP(s).

6. County's Rights and Obligations: Any time the County determines, in the sole exercise of its discretion, that the detention basin/BMP(s) is not properly cleaned, maintained and/or otherwise kept in good repair, the County shall give reasonable notice to the District and its successors and assigns, that the detention basin/BMP(s) needs to be cleaned, maintained and/or otherwise repaired. The notice shall provide a reasonable time to correct the problem(s). Should the responsible parties fail to correct the specified problem(s), the County may enter upon the Property to so correct the specified problem(s). Notice shall be effective to the above by the County's deposit of the same into the regular United States mail, postage pre-paid. Notwithstanding the foregoing, this Agreement does not expressly or implicitly impose on the County a duty to so inspect, clean, repair or maintain the detention basin/BMP(s).

7. Reimbursement of County's Costs / Covenant Running With the Land: The District agrees and covenants, for itself, its successors and assigns, that it will reimburse the County for its costs and expenses incurred in the process of completing construction of, cleaning, maintaining, and/or repairing the detention basin/BMP(s) pursuant to the provisions of this Agreement.

The term "actual costs and expenses" shall be liberally construed in favor of the County, and shall include, but shall not be limited to, labor costs, tools and equipment costs, supply costs, and engineering and design costs, regardless of whether the County uses its own personnel, tools, equipment and supplies, etc. to correct the matter. In the event the County initiates any litigation or engages the services of legal counsel in order to enforce the provisions arising herein, the County shall be entitled to its damages and costs, including reasonable attorney's fees, regardless of whether the County contracts with outside legal counsel or utilizes in-house legal counsel for the same.

8. Contingencies of Land Use/Land Disturbance Approval: District/Owner's execution of this Agreement is a condition of land use/land disturbance approval.

The County shall have the right, in the sole exercise of its discretion, to approve or disapprove any documentation submitted to it under the conditions of this Paragraph, including but not limited to, any separate agreement or amendment, if applicable, identifying any specific maintenance responsibilities not addressed herein. The County's rejection of any documentation submitted hereunder shall mean that the appropriate condition of this Agreement has not been fulfilled.

9. Agreement Monitored by El Paso County Planning and Community Development Department and/or El Paso County Department of Public Works: Any and all actions and decisions to be made hereunder by the County shall be made by the Director of the El Paso County Planning and Community Development Department and/or the Director of the El Paso County Department of Public Works. Accordingly, any and all documents, submissions, plan approvals, inspections, etc. shall be submitted to and shall be made by the Director of the Planning and Community Development Department and/or the Director of the El Paso County Department of Public Works.

10. Indemnification and Hold Harmless: To the extent authorized by law, District/Owner agree, for themselves and their respective successors and assigns, that they will indemnify, defend, and hold the County harmless from any and all loss, costs, damage, injury, liability, claim, lien, demand, action and causes of action whatsoever, whether at law or in equity, arising from or related to its intentional or negligent acts, errors or omissions or that of its agents, officers, servants, employees, invitees and licensees in the construction, operation, inspection, cleaning (including analyzing and disposing of any solid or hazardous wastes as defined by State and/or Federal environmental laws and regulations), maintenance, and repair of the detention basin/BMP(s), and such obligation arising under this Paragraph shall be joint and several. Nothing in this Paragraph shall be deemed to waive or otherwise limit the defense available to the County pursuant to the Colorado Governmental Immunity Act, Sections 24-10-101, *et seq.* C.R.S., or as otherwise provided by law.

11. Severability: In the event any Court of competent jurisdiction declares any part of this Agreement to be unenforceable, such declaration shall not affect the enforceability of the remaining parts of this Agreement.

12. Third Parties: This Agreement does not and shall not be deemed to confer upon or grant to any third party any right to claim damages or to bring any lawsuit, action or other proceeding against either the County, the District/Owner, or their respective successors and assigns, because of any breach hereof or because of any terms, covenants, agreements or conditions contained herein.

13. Solid Waste or Hazardous Materials: Should any refuse from the detention basin/BMP(s) be suspected or identified as solid waste or petroleum products, hazardous substances or hazardous materials (collectively referred to herein as “hazardous materials”), the District/Owner shall take all necessary and proper steps to characterize the solid waste or hazardous materials and properly dispose of it in accordance with applicable State and/or Federal environmental laws and regulations, including, but not limited to, the following: Solid Wastes Disposal Sites and Facilities Acts, §§ 30-20-100.5 – 30-20-119, C.R.S., Colorado Regulations Pertaining to Solid Waste Disposal Sites and Facilities, 6 C.C.R. 1007-2, *et seq.*, Solid Waste Disposal Act, 42 U.S.C. §§ 6901-6992k, and Federal Solid Waste Regulations 40 CFR Ch. I. The County shall not be responsible or liable for identifying, characterizing, cleaning up, or disposing of such solid waste or hazardous materials. Notwithstanding the previous sentence, should any refuse cleaned up and disposed of by the County be determined to be solid waste or hazardous materials, the District/Owner, but not the County, shall be responsible and liable as the owner, generator, and/or transporter of said solid waste or hazardous materials.

14. Applicable Law and Venue: The laws, rules, and regulations of the State of Colorado and El Paso County shall be applicable in the enforcement, interpretation, and execution of this Agreement, except that Federal law may be applicable regarding solid waste or hazardous materials. Venue shall be in the El Paso County District Court.

IN WITNESS WHEREOF, the Parties affix their signatures below.

Executed this _____ day of _____, 20____, by:

Widefield Water and Sanitation District

By: _____

The foregoing instrument was acknowledged before me this _____ day of _____, 20____, by _____ as _____ of Widefield Water and Sanitation District.

Witness my hand and official seal.

My commission expires: _____

Notary Public

Executed this _____ day of _____, 20____, by:

BOARD OF COUNTY COMMISSIONERS
OF EL PASO COUNTY, COLORADO

By: _____

_____, Chair

The foregoing instrument was acknowledged before me this _____ day of _____, 20____, by _____, Executive Director of El Paso County Planning and Community Development Department.

Witness my hand and official seal.

My commission expires: _____

Notary Public

Approved as to Content and Form:

Assistant County Attorney

Exhibit A

Legal Description of Easement and Temporary Construction Easement Attached

EXHIBIT A
TANK EASEMENT

June 8, 2020

A portion of the Northwest Quarter of Section 1, Township 15 South, Range 65 West of the Sixth P.M., being located in the City of Colorado Springs, El Paso County, Colorado, being more particularly described as follows:

COMMENCING at the Northwest Corner of said Section 1; thence S00°23'53"E, (Bearings are relative to the West line of the Southwest Quarter of said Section 1, being monumented at Southwest Corner by a No. 6 rebar with a 3 1/4" aluminum cap stamped, "PLS 19109" "2004" flush with grade, and at the West Quarter Corner of said Section 1, by a 3 1/4" aluminum cap, illegible, 0.3' below grade, having a measured bearing and distance of N00°23'37"W, 2632.05 feet), along the west line of said Northwest Quarter, a distance of 1499.31 feet; thence N89°36'23"E, leaving said west line, a distance of 1029.49 feet, to the **POINT OF BEGINNING**; thence along the following six (6) courses:

1. N31°58'03"E, a distance of 332.51 feet;
2. S88°47'47"E, a distance of 283.81 feet;
3. S00°13'02"E, a distance of 254.45 feet;
4. S56°50'23"W, a distance of 317.09 feet;
5. S89°25'23"W, a distance of 195.03 feet;
6. N00°06'20"W, a distance of 153.74 feet, to the **POINT OF BEGINNING**.

Containing 151,246 Sq. Ft. or 3.472 acres, more or less.

Together with :

A 50 foot temporary construction easement being offset 50 feet outward from the above described easement.



Stewart L. Mapes, Jr.
Colorado Professional Land Surveyor No. 38245
For and on behalf of Clark Land Surveying, Inc.

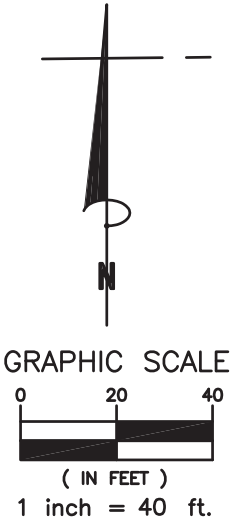
EXHIBIT A TANK EASEMENT

POC
NW CORNER OF SEC. 1
T.15 S., R.65W.
SIXTH P.M.
3 1/4" ALUMINUM CAP
IN RANGE BOX
STAMPED, "PLS 17496"

DRENNAN ROAD
(60' PUBLIC R.O.W.)
(BOOK A, PAGE 78)

OWNER:
CS 2005
INVESTMENTS LLC
(NO DEED OF RECORD
PER ASSESSOR)
(2017 SCHEDULE NO.
5500000385)

NW 1/4
SEC. 1
T.15S., R.65W.
SIXTH P.M.



S00°23'53"E 2682.85'

1499.31' (TIE)

FOUND 3 1/4"
ALUMINUM CAP
1/4 CORNER
SEC. 1 & SEC. 2
0.3 BELOW GRADE

N00°23'37"W 2632.05'
(BASIS OF BEARINGS)

FOUND #6 REBAR W/
3 1/4" ALUM. CAP
"PLS 16109" "2004"
FLUSH W/ GRADE
SE COR. SEC. 2

N89°36'23"E
1029.49' (TIE)

POB

PERMANENT TANK EASEMENT
151,247 S.F.±
(3.472 ACRES±)

N00°06'20"W
153.74'

S89°25'23"W
195.03'

S88°47'47"E 283.81'

N31°58'03"E 332.51'

S00°13'02"E 254.45'

S56°50'23"W 317.09'

50' TEMPORARY
CONSTRUCTION EASEMENT



NOTE:
This EXHIBIT does not
represent a monumented
land survey, and is only
intended to depict the
attached LEGAL DESCRIPTION.

Project No: 190988	Drawn: SCG Check: SLM	Date: 6/8/2020 Sheet 2 of 2
-----------------------	--------------------------	--------------------------------

Clark
Land Surveying, Inc.

177 S. Tiffany Dr., Unit 1 • Pueblo West, CO 81007 • 719.582.1270
www.clarks.com

EXHIBIT A
ACCESS EASEMENT

August 12, 2020

A portion of the Northwest Quarter of Section 1, Township 15 South, Range 65 West of the Sixth P.M., being located in the City of Colorado Springs, El Paso County, Colorado, being more particularly described as follows:

COMMENCING at the Northwest Corner of said Section 1; thence N89°21'47"E, (Bearings are relative to the West line of the Southwest Quarter of said Section 1, being monumented at the Southwest Corner of said Section 1 by a no. 6 rebar with a 3 1/4" aluminum cap stamped, "PLS 19109" "2004" flush with grade, and at the West Quarter Corner of said Section 1, by a 3 1/4" aluminum cap, illegible, 0.3' below grade, having a measured bearing of N00°23'37"W, a distance of 2,632.05 feet), along the north line of said Northwest Quarter, a distance of 1,358.99 feet; thence leaving said north line, S00°38'13"E, a distance of 30.00 feet, to a point on the South Right-of-Way line of Drennan Road, as reserved in Book A, Page 78, and the **POINT OF BEGINNING**; thence along said South Right-of-Way line, N89°21'47"E, a distance of 30.00 feet; thence leaving said South Right-of-Way line, the following Twenty One (21) courses:

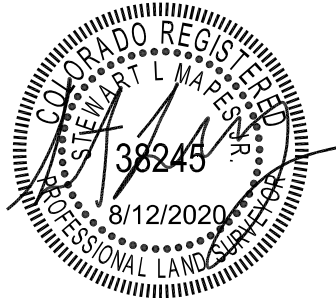
1. S00°38'13"E, a distance of 15.84 feet;
2. a curve to the left, with an arc length of 29.00 feet, a radius of 35.00 feet, a delta angle of 47°28'34";
3. S48°06'47"E, a distance of 63.57 feet;
4. a curve to the right, with an arc length of 383.09 feet, a radius of 523.35 feet, a delta angle of 41°56'26";
5. S08°08'04"W, a distance of 448.35 feet;
6. N90°00'00"E, a distance of 56.11 feet;
7. S00°00'00"E, a distance of 100.55 feet;
8. N90°00'00"W, a distance of 52.99 feet;
9. S12°55'10"E, a distance of 190.10 feet;
10. a curve to the right, with an arc length of 121.27 feet, a radius of 92.00 feet, a delta angle of 75°31'24";
11. S62°36'14"W, a distance of 61.41 feet;
12. N00°13'02"W, a distance of 33.72 feet;
13. N62°36'14"E, a distance of 46.01 feet;
14. a curve to the left, with an arc length of 81.72 feet, a radius of 62.00 feet, a delta angle of 75°31'24";
15. N12°55'10"W, a distance of 227.76 feet;
16. N00°04'18"W, a distance of 40.55 feet;
17. N08°08'04"E, a distance of 479.12 feet;
18. a non-tangent curve to the left, with an arc length of 357.42 feet, a radius of 493.35 feet, a delta angle of 41°30'34", a radial of S83°23'47"W;
19. N48°06'47"W, a distance of 63.57 feet;
20. a curve to the right, with an arc length of 53.86 feet, a radius of 65.00 feet, a delta angle of 47°28'34";
21. N00°38'13"W, a distance of 15.84 feet, to a point on said South Right-of-Way line, and the **POINT OF BEGINNING**.



Containing 47,603 Sq. Ft. or 1.093 acres, more or less.

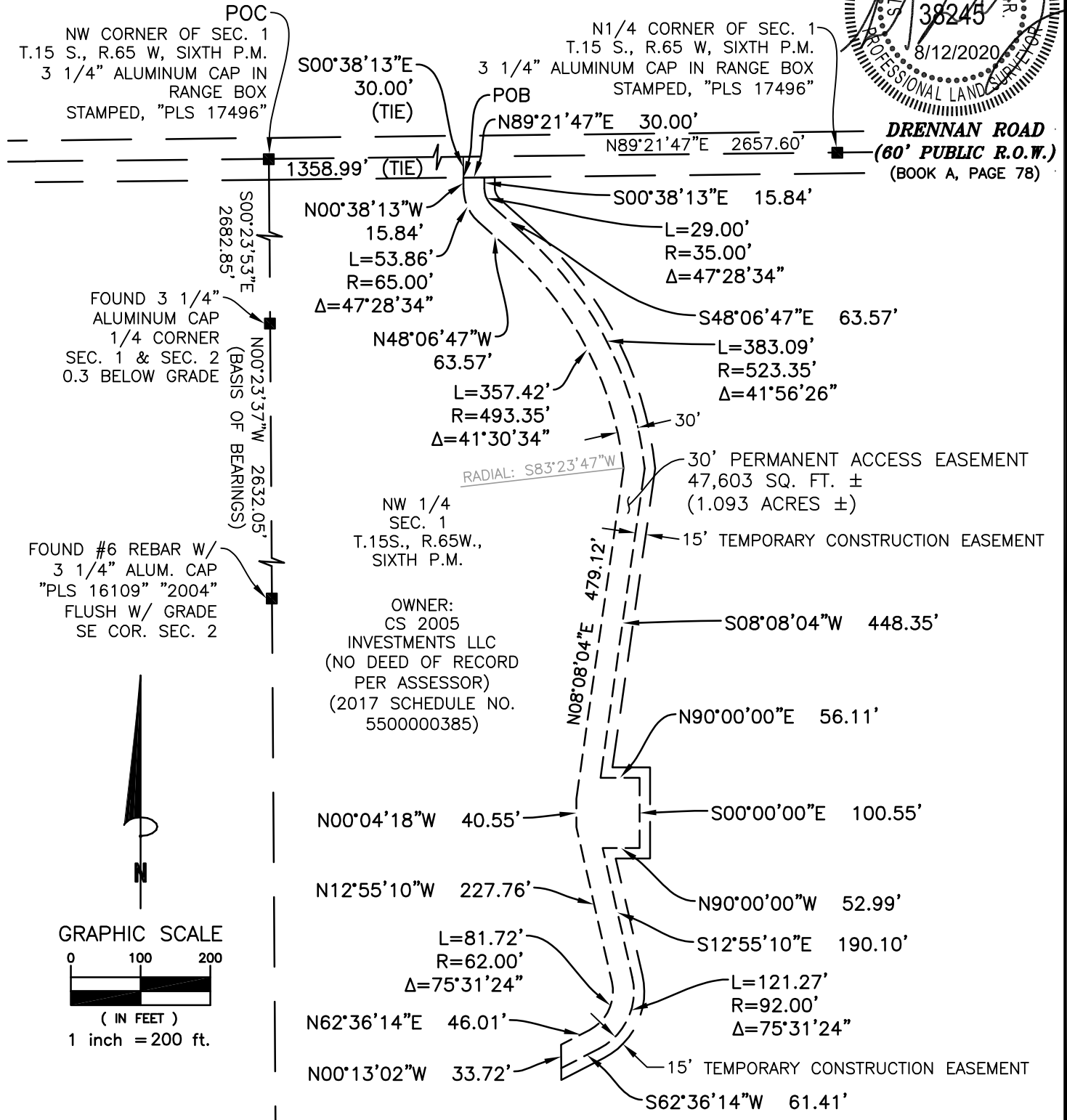
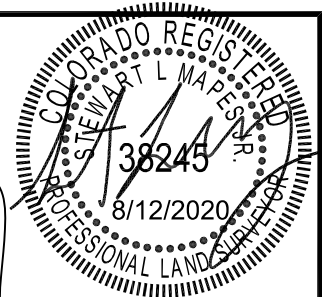
Together with:

A 15 foot temporary construction easement being offset 15 feet easterly from the above described easement.



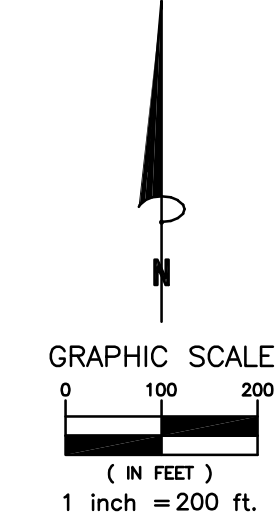
Stewart L. Mapes, Jr.
Colorado Professional Land Surveyor No. 38245
For and on behalf of Clark Land Surveying, Inc.

EXHIBIT A ACCESS EASEMENT



FOUND #6 REBAR W/
3 1/4" ALUM. CAP
"PLS 16109" "2004"
FLUSH W/ GRADE
SE COR. SEC. 2

OWNER:
CS 2005
INVESTMENTS LLC
(NO DEED OF RECORD
PER ASSESSOR)
(2017 SCHEDULE NO.
5500000385)



NOTE:
This EXHIBIT does not
represent a monumented
land survey, and is only
intended to depict the
attached LEGAL DESCRIPTION.

Project No: 190988	Drawn: CME Check: SLM	Date: 8/12/2020 Sheet 3 of 3
-----------------------	--------------------------	---------------------------------

Clark
Land Surveying, Inc.

177 S. Tiffany Dr., Unit 1 • Pueblo West, CO 81007 • 719.582.1270
www.clarkls.com