



Operation Procedures
for
Inspection and Maintenance
of
Drainage Channel

Eagleview Subdivision

In association with Project SF-22-42

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Introduction

This plan addresses operation and maintenance for the vegetation within the identified drainage channels located within the **Eagleview Subdivision (PCD File No: SF-22-42)**. The drainage channels are located within the Falcon Drainage Basin-West Tributary, a studied basin by El Paso County, as part of the Falcon Drainage Basin Planning Study (Falcon DBPS).

Facilities Description

The maintenance responsibilities of this operation and maintenance manual (O&M Manual) are for the following reaches, or drainage channels, described in the Falcon DBPS and shown graphically in color on the attached stormwater facility map:

- RWT094 (north of the proposed S. Arroya Lane) -shown in blue
- RWT092 -shown in green
- RWT054 -shown in orange
- RWT080 -shown in red

The design for these identified channels consists of concrete check structures with upstream and downstream riprap protection, coir matting, and natural vegetation. Per the Stormwater Facility Maintenance Agreement and Easement, the Eagleview Metropolitan District will maintain and properly manage the grasses and vegetation within these channels, approximately defined as top of bank to top of bank.

Per the Stormwater Facility Maintenance Agreement, the County is responsible for maintenance of the concrete check structures, upstream and downstream riprap protection for each check structure and maintenance roads along the channel. Per the Falcon DBPS, the County is also responsible for the maintenance of channel RWT094 south of South Arroya Lane, which is in a public drainage easement. This O&M manual does not cover the operations and maintenance for that portion of channel RWT094.

Funding for and Organization of Facility Operation and Maintenance

Eagleview Metropolitan District ("Metro District") will be responsible for operations and maintenance of the vegetation of the identified drainage channels, approximately defined as top of bank to top of bank, upon final acceptance of the drainage facility through the El Paso County process.

Drainage Channel (DC) Description

The subsections below describe general drainage channel operations and maintenance.

DC-1 INSPECTING DRAINAGE CHANNELS

DC-1.1 Access and Easements

The attached stormwater facility map containing the location(s) of the access points and maintenance easements of the drainage channels within this development should be utilized by inspection and maintenance personnel.

DC-2.2 Stormwater Management Facilities Locations

Following is a summary of the channels that are the responsibility of the Metro District. See attached stormwater facility map for location(s).

- RWT094 (north of the proposed S. Arroya Lane) -shown in blue
- RWT092 -shown in green
- RWT054 -shown in orange
- RWT080 -shown in red

DC-2.2 Drainage Channel Features

It is critical that the drainage channel is properly inspected and maintained to ensure that the overall facility functions as intended.

Below is a table and description of the maintenance inspection items that are the responsibility of the Metro District:

Table DC-1: Typical Inspection & Maintenance Requirements Matrix

Channel Features	Weed Control	Trash & Debris Removal	Erosion
Embankment/ Side Slopes	X	X	X
Channel Bottom	X	X	

The erosion inspection and maintenance indicated in the table above refers to new erosion and excludes the maintenance of existing natural features composed of sandy loam/ clay. These natural features are a part of the landscape and should not be part of the maintenance plan outlined in this manual. There are six identified areas on the stormwater facility map (shown in magenta) that are intended to remain without disturbance.

Miscellaneous

There are a variety of inspection/maintenance responsibilities that are not typical (as detailed above) maintenance of the drainage channel. This category on the inspection form is for maintenance items that are not commonly found in a drainage channel.

- a. *Encroachment in Easement Area* –Property owners may place landscaping, trash, fencing, or other items within the easement area that may affect maintenance or the operation of the facility.
- b. *Public Hazards* – Public hazards include items such as vertical drops of greater than 4-feet, containers of unknown/suspicious substances, 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 Sheriff at 911 immediately!
- c. *Burrowing Animals/Pests* – Prairie dogs and other burrowing rodents may cause damage to the drainage channel features and negatively affect the vegetation within the drainage channel. Consult EPC Environmental Division if this becomes an issue.
- d. *Other* – Any miscellaneous inspection/maintenance items not contained on the form should be entered here.

DC-2 MAINTAINING DRAINAGE CHANNEL (DC)

DC-2.1 Maintenance Personnel

Maintenance personnel must be qualified to properly maintain drainage channels. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs.

DC-2.2 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 the drainage channel:

- 1.) Shovels
- 2.) Rakes
- 3.) All Surface Vehicle (ASVs)
- 4.) Filter Fabric
- 5.) Erosion Control Blanket(s)
- 6.) Seed Mix (Native)
- 7.) Trash Bags

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.

DC-2.3 Safety

Natural and manmade vertical drops may be encountered in areas located within and around the facility. Avoid walking on top of the concrete check structures, other structures, or natural features that have a significant vertical drop. If a vertical drop is identified within the drainage channel that is greater than 48" in height, make the appropriate note/comment on the maintenance inspection form.

DC-2.4 Maintenance Categories and Activities

A typical Maintenance Program will consist of three broad categories of work: routine, minor, and major maintenance activities. Within each category of work, a variety of maintenance activities can be performed on the drainage channel. A maintenance activity can be specific to each feature within the drainage channel, or general to the overall facility. The maintenance activities range in magnitude from routine trash pickup to the reconstruction of embankments. The following three sub-sections (2.5, 2.6, and 2.7) explain each of the categories and briefly describes the typical maintenance activities for a drainage channel, including the objectives and frequency of actions.

DC-2.5 Routine Maintenance Activities

The majority of this work consists of regularly scheduled weed control and trash and debris pickups for stormwater management facilities during the growing season. These activities will normally be performed numerous times during the year. These items can be completed without any prior correspondence with the EPC Stormwater; however, completed inspection and maintenance forms shall be retained for each inspection and maintenance activity.

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

TABLE – DC-2 Summary of Routine Maintenance Activities

MAINTENANCE ACTIVITY	MINIMUM FREQUENCY	LOOK FOR	MAINTENANCE ACTION
Trash/Debris Removal	Twice annually	Trash & debris along embankment and channel bottom	Remove and dispose of trash and debris to impedes flow
Weed control	Minimum twice annually	Noxious weeds; Unwanted vegetation	Treat w/ herbicide or hand pull; Consult the local weed specialist

DC-2.5.2 Trash/Debris Removal

Trash and debris must be removed from the embankments of the drainage channel to minimize outlet clogging and to improve aesthetics.

Frequency – Routine –Minimum of twice annually.

DC-2.5.3 Weed Control

Noxious weeds and other unwanted vegetation must be treated as needed throughout the drainage channel. This activity can be performed through mechanical means (pulling) or with herbicide. Consultation with the Environmental Division at 719-520-7878 is highly recommended prior to the use of herbicide.

Frequency – Routine – As needed based on inspections.

DC- 2.6 Minor Maintenance Activities

This work consists of a variety of isolated or small-scale maintenance or operational problems. Most of this work can be completed by a small crew, tools, and small equipment. These items may require prior correspondence with EPC Stormwater and require completed inspection and maintenance forms to be submitted to EPC upon request for each inspection and maintenance activity.

Table – DC-3 Summary of Minor Maintenance Activities

MAINTENANCE ACTIVITY	MINIMUM FREQUENCY	LOOK FOR	MAINTENANCE ACTION
Erosion Repair	As needed, based upon inspection	Rills/gullies forming on embankments, excluding identified natural features	Repair eroded areas Revegetate; address source of erosion

DC-2.6.1 Erosion Repair

The repair of newly eroded areas along the embankments, at or lower than the check structures, is necessary to ensure the proper function of the drainage channel, minimize sediment transport, and to reduce potential impacts to other features. The repair of eroded areas may require the use of excavators, earthmoving equipment, riprap, concrete, erosion control blankets, and turf reinforcement mats. Major erosion repair to the drainage channel embankments will require consultation with EPC Stormwater Staff.

There are six identified natural features described in Section DC-2.2 of this manual and identified on the stormwater facility map (shown in magenta) that are intended to remain without disturbance. The Metro District is not responsible for the maintenance of the existing natural features. The Metro District is responsible for new erosion occurring within the channel.

Frequency – Nonroutine – As necessary based upon inspections.

DC-2.7 Major Maintenance Activities

This work consists of larger maintenance/operational problems and failures within the stormwater management facilities. All of this work requires consultation with EPC Stormwater Staff to ensure the proper maintenance is performed. This work requires that the staff review the original design and construction drawings to assess the situation and assign the necessary

maintenance. **An ESQCP permit may be required for major maintenance activities.** This work may also require more specialized maintenance equipment, design/details, surveying, or assistance through private contractors and consultants.

Table – DC-4 Summary of Major Maintenance Activities

MAINTENANCE ACTIVITY	MINIMUM FREQUENCY	LOOK FOR	MAINTENANCE ACTION
Major Erosion Repair	As needed – based upon scheduled inspections	Severe erosion including gullies, excessive soil displacement, areas of settlement, holes, excluding identified natural features	Repair erosion – find cause of problem and address to avoid future erosion

DC-3.7.1 Major Erosion Repair

Major erosion repair consists of filling and revegetating areas of severe erosion. These events are not anticipated and would be considered rare. The check structures are built to the 100-year water surface elevation, thus any major erosion would be classified as any new erosion higher than the elevation of the check structures. Determining the cause of the erosion as well as correcting the condition that caused the erosion should also be part of the erosion repair.

Frequency – Nonroutine – Repair as needed based upon inspections.

Inspection and Maintenance Forms

DRAINAGE CHANNEL INSPECTION FORM

Date: _____

Subdivision/Business Name: _____ Inspector: _____

Subdivision/Business Address: _____

Weather: _____

Date of Last Rainfall: _____ Amount: _____ Inches

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

1.) Embankments

____ Weed Control
____ Trash/Debris Removal
____ Erosion Present (beyond natural state) describe below

2.) Channel Bottom

____ Weed Control
____ Trash/Debris Removal
____ Erosion Present (beyond natural state) describe below

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

**DRAINAGE CHANNEL
MAINTENANCE FORM**

Subdivision/Business Name: _____ Completion Date: _____

Subdivision/Business Address: _____ Contact Name: _____

Maintenance Category: Routine Minor Rehabilitation
(Circle All That Apply)

MAINTENANCE ACTIVITIES PERFORMED

ROUTINE WORK

- ____ TRASH/DEBRIS REMOVAL
- ____ WEED CONTROL (HERBICIDE APPLICATION)

MINOR MAINTENANCE

MAJOR MAINTENANCE

- ____ EROSION REPAIR
- ____ EMBANKMENT
- ____ CHANNEL BOTTOM

- ____ EROSION REPAIR
- ____ EMBANKMENT
- ____ CHANNEL BOTTOM

OTHER _____

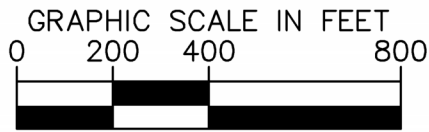
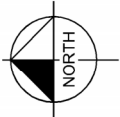
ESTIMATED TOTAL MANHOURS: _____

COSTS INCURRED (include description of costs):

EQUIPMENT/MATERIAL USED (include hours of equipment usage and quantity of material used):





COMMENTS/ADDITIONAL INFO:

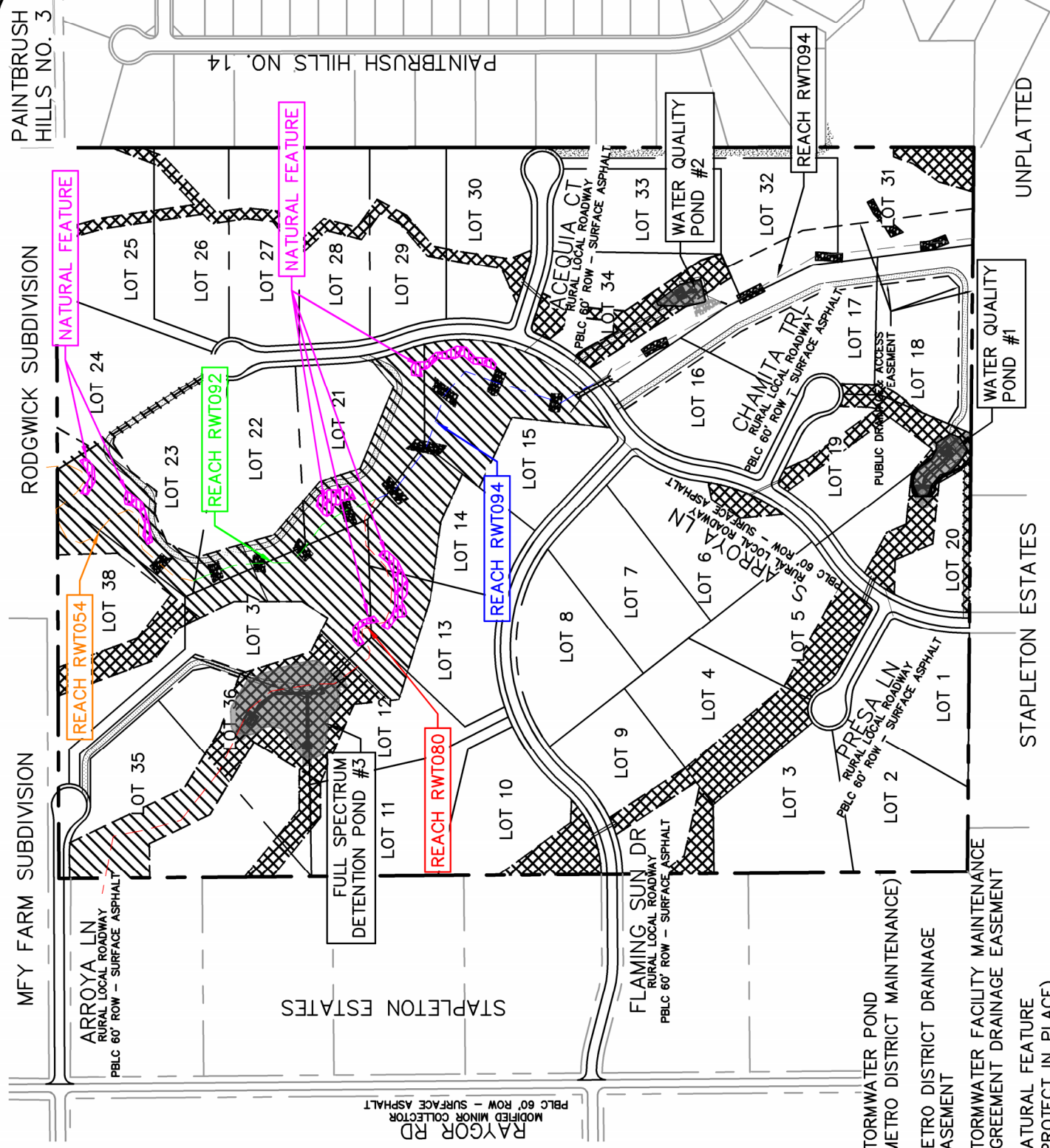
Stormwater Facility Map



EAGLEVIEW- DRAINAGE FACILITIES EXHIBIT

LEGEND

-  STORMWATER POND (METRO DISTRICT MAINTENANCE)
-  METRO DISTRICT DRAINAGE EASEMENT
-  STORMWATER FACILITY MAINTENANCE AGREEMENT DRAINAGE EASEMENT
-  NATURAL FEATURE (PROTECT IN PLACE)



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