

# OPERATION AND MAINTENACE MANUAL FOR 1<sup>ST</sup> ADDITION TO PINE CLIFF

Metro Engineering, Inc.'s  
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# 1<sup>st</sup> ADDITION TO PINE CLIFF

## OPERATION AND MAINTENANCE MANUAL

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## INTRODUCTION

This Operation and Maintenance Manual is for the stormwater collection and disposal system (outside of Spokane County right-of-way) which serves the 1<sup>st</sup> Addition to Pine Cliff.

The 1<sup>st</sup> Addition to Pine Cliff Homeowners Association is responsible and liable for the maintenance and operation of the stormwater facilities within the 1<sup>st</sup> Addition to Pine Cliff. The record drawings which give the specifics of the drainage facilities are located in the attached pockets.

The Homeowners Association shall designate an individual or group of individuals to be responsible for the operation and maintenance of the stormwater facilities (herein referred to as the operator). The operator shall be familiar with the facilities and have an understanding of the intent of the facilities. They shall also be familiar with general good operating practices for stormwater collection and disposal. They must keep the interest of the public and the homeowners as the highest priority during their operation and maintenance.

### RESPONSIBILITY

It is the responsibility of the 1<sup>st</sup> Addition to Pine Cliff Homeowners Association to provide effective, efficient, and continuous operation and maintenance of the stormwater facilities and related appurtenances. Spokane County will be responsible for maintaining the portion of the drainage system which is located within their right-of-way.

### DESCRIPTION OF THE SYSTEM

Please refer to the record drawings in the attached pockets.

The stormwater system is comprised of offsite interception ditches, collection system (i.e. catch basins and pipes), retention pond and overflow. The stormwater from the service area is either conveyed by pipe or overland to the retention pond. The retention pond is located in Tract "A".

## MAINTENANCE AND OPERATION

The pond, ditches, and overflow structure shall be visually inspected once each month. Visual inspections should increase to twice per month during the winter and spring months and following all major storm events. The pond and ditches should be maintained per the outline below and as listed on the maintenance checklist. Sediment deposits in the bottom of the pond shall be removed regularly in order to maintain the design volume. The overflow structure shall be kept free of obstructions, including sediment.

The integrity of the pond side slopes should be inspected with each visual inspection to ensure there is no erosion. Also, the fence surrounding the pond should be checked with each visual inspection.

### MAINTENANCE TASK

### FREQUENCY

#### I. Summer (March-October)

Visual Inspection

Monthly and after major rain events

Pond:

Weeding/weed control

As necessary, remove noxious weeds as they appear

Raking and litter control

As necessary, primarily at the end of autumn

Repair Fence

As necessary to keep pond secure

Overflow:

Clear debris (including excess vegetation) from overflow

As necessary to keep overflow clear

Cleanout catch basin

As necessary to keep clear of sediment

Offsite Interception Ditches:

Weeding/weed control

As necessary, remove noxious weeds as they appear

Raking and litter control

As necessary, primarily at the end of autumn

Storm Drains: (See general note 5)

Clean and flush lines

Annually or as necessary to keep pipes clean

## II. Winter (November-February)

Visual Inspection and litter control

Semi-monthly and after major rain events

Clear snow & ice from overflow and inlets

As necessary to keep overflow and inlets clear

### GENERAL NOTES:

1. Generally the ponds and ditches will not need to be watered. If during the dry season areas need to be watered to keep the grass alive, precautions shall be taken to not over water the soil. Do not over water.
2. Grass clippings and other debris from maintenance of the pond, ditches and common areas shall not be dumped in the pond. Rubbish, litter and materials removed during maintenance shall be disposed of in an approved manner.
3. The retention pond is intended to handle typical residential strength stormwater runoff. Hazardous materials, such as, but not limited to, oil, fertilizers, paint, battery acid, antifreeze fuel oil, and other materials commonly recognized as deleterious to water quality, shall not be discharged into the stormwater system. Precautions should always be taken to prevent these items from entering the stormwater system. If hazardous materials accidentally enter the stormwater system they shall be removed and disposed of immediately by approved methods.
4. All storm drains outside of the public right of way shall be maintained by the Homeowners Association. Primarily this would be the storm drains located in Tract A.

This maintenance plan and schedule is only a rough guide; the intent is to keep the stormwater facilities fully functional and maintained as a neighborhood asset. The schedule may need to be adjusted after the stormwater facilities have been in operation and their performance observed.

## FINANCIAL CONSIDERATIONS

The design life of the drainage system (assuming minimal maintenance) could be anywhere from 20 to 50 years. The service life of the facilities depends almost entirely on how well the facilities have been maintained.

The annual maintenance cost to repair and maintain the stormwater system is estimated at \$500.

The replacement cost annual set-aside for the stormwater system is calculated at \$596.

Figuring the annual cost and the replacement cost amortized over 20 years the annual amount to be set aside to operate and maintain the system shall be \$1096.

The 1<sup>st</sup> Addition to Pine Cliff Homeowners Association shall create a "sinking-fund" to account for maintenance and replacement of the drainage facilities. The above annual amount shall be added to the account annually. Expenses to maintain the system will come out of this account. However, the fund should grow annually by the amortized replacement cost.

Liability insurance shall be carried by the Homeowners Association, per the Spokane County Code. This liability insurance would need to cover all common areas and interests held by the Homeowners Association.

### Sinking Fund Reserve Account

#### Calculation for Operation and Maintenance Costs plus Replacement Costs For Annual Cost per Lot

Annual Operation and Maintenance Costs	\$500
Present Value of Drainage System, PV	\$20,000
Assume 50% replacement of pond and structures in 20 yrs.	PV/2 = \$10,000
Future Value to replace in 20 years, FV assuming inflation = 4%, n=20	FV=PV/2(F/P, 4%, n=20) FV=\$10,000(2.1911)=\$21,911
Annual Set-aside for future replacement of pipes, A assume conservative investment; interest=6%	A=\$21,911 (A/F,6%,n=20) A=\$21,911 (0.0272)=\$596
Total charges per Lot 5 lots Annual Charge/Lot = (Annual Costs) + (annual set-aside amount, A)	Total Annual Charge = (O&M)+(A) Total Annual Charge = \$1096 Annual Charge/Lot = \$1096/5 lots = \$219.20

# **APPENDIX A**

# 1ST ADDITION TO PINE CLIFF MAINTENANCE CHECKLIST

NOTE:  
Put date of inspection/  
maintenance in box and initial.

YEAR: \_\_\_\_\_

COMPONENT/TASK	FREQUENCY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
RETENTION POND													
VISUAL INSPECTION	SUMMER												
VISUAL INSPECTION	WINTER												
WEED/LITTER CONTROL	AS NECESSARY												
RAKING	AS NECESSARY												
REPAIR FENCE	AS NECESSARY												
REMOVE SEDIMENT	ANNUALLY OR AS NECESSARY												
OFFSITE INTERCEPTION DITCHES													
VISUAL INSPECTION	MONTHLY *												
WEED/LITTER CONTROL/RAKING	AS NECESSARY												
PIPES FROM INTERCEPTION DITCHES TO CATCH BASINS													
VISUAL INSPECTION	MONTHLY *												
CLEAR DEBRIS FROM INLETS	AS NECESSARY												
CLEAN PIPES	AS NECESSARY												
OVERFLOW													
CLEAR DEBRIS FROM OVERFLOW	AS NECESSARY												
CLEANOUT CATCH BASIN & PIPING	AS NECESSARY												

COMMENTS:

\* AND AFTER EACH MAJOR RAIN EVENT