



STORMWATER MANAGEMENT OPERATION AND MAINTENANCE MANUAL

For

174 Church Street, Keyport LLC

Lots 4-10 & 13, Block 85
Borough of Keyport
Monmouth County, NJ

March 22, 2022

Project #20152

PREPARED BY:

A handwritten signature in black ink, appearing to read 'W. Hopkin', with a long horizontal line extending to the right.

Walter Joseph Hopkin
New Jersey Professional Engineer
License Number 40673

Acceptance of Responsibility

For
Operation and Maintenance
Of The

Stormwater Management Installations and Appurtenances

Upon

Lots 4-10 & 13, Block 85

Borough of Keyport, Monmouth County, State of New Jersey

Property Owner: 174 Church Street, Keyport LLC

Address: 117 First Street
Keyport, NJ 07735

Telephone: (732) 888-7792

By (if Owner is a Corporation): John Fahey

Title: Managing Member

I acknowledge and agree, by my signature below, that I am/legally represent the OWNER of this referenced property. Further, (on behalf of the OWNER) I accept total responsibility for performance of the inspections, operations, maintenance activities, and procedures herein.

Signature: _____, Property Owner

Date: _____

Subscribed and sworn to
Before me on this____day
of_____, 20____
(Notary)

(Name)

Notary Public of _____

My commission expires _____, 20_____

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PART I - BACKGROUND DATA

Introduction

The manual is being submitted as part of the development application for **174 Church Street, Keyport LLC**, located on **Lots 4-10 & 13, Block 85**, as shown on Sheet 10 of the Official Tax Map of Borough of Keyport, Monmouth County, New Jersey. This report was prepared in accordance with the current industry standards and practices for stormwater management.

This manual is prepared on behalf of the applicant, 174 Church Street, Keyport LLC, to provide guidelines necessary for the maintenance and repair of the existing and constructed stormwater management facilities as part of the development shown on the most current set of Preliminary and Final Major Site Plans prepared by WJH Engineering.

Project Description

The redevelopment of the property consists of demolishing all the existing buildings and structures and the construction of six (6) duplex buildings, two (2) single-family dwellings, associated access driveways, utility connections, light and landscaping improvements, and stormwater management facilities. Additionally, the northern end of Osborn Street is proposed to be improved to provide access to the duplex units fronting that portion of Osborn Street.

Proposed Stormwater Management Facilities

The stormwater management system consists of four (4) underground infiltration detention basins and one (1) underground detention basin. The stormwater runoff generated from the majority of the redeveloped site will be directed into the underground basins.

The infiltration/detention basins are designed to store and infiltrate the entire runoff volume generated by the 100-year storm event by the area directed into them. The detention basin is designed to store and manage the increase of stormwater runoff generated by the proposed driveways and portion of Osborn Street. The detention basin is proposed to discharge into the existing drainage system in Church Street.

Project Authorization

This manual is prepared by WJH Engineering for JOHN FAHEY to provide a mechanism by which remedial repairs and routine maintenance items can be performed to avoid long-term degradation of the stormwater management facilities.

The party responsible for the maintenance and repair of the stormwater management facilities onsite is:

JOHN FAHEY
117 First Street
Keyport, NJ 07735

JOHN FAHRY contracts directly with outside contractors for the maintenance and repair of the subject site and the stormwater management facilities. This includes maintenance of onsite landscaped areas and required snow removal operations. Periodic maintenance of the stormwater management facilities will be contracted with and performed by a licensed qualified contractor.

Project Contracts

All onsite stormwater management facilities and site construction shall be constructed by an experienced, qualified, and licensed contractor in accordance with the latest set of plans prepared by WJH Engineering.

Miscellaneous Correspondence

A record of routine inspections and routine or corrective maintenance performed by JOHN FAHEY shall be kept on file. Copies of all inspection and maintenance reports shall be available for review by governing agencies as required.

PART II - OPERATION AND MAINTENANCE

General Information

A well-organized operations and maintenance manual will protect the stormwater management facilities against deterioration while prolonging the life of the facility. The cost of a proper Operations and Maintenance Program is miniscule compared to the cost of major repairs for reconstruction of the facilities after failure occurs. The manual establishes a basic operations and maintenance program based primarily on systematic inspections of the facilities by a representative of JOHN FAHEY.

As this manual is being prepared prior to construction, no inspections have been performed. A regular inspection means the visual inspection of the facilities by a representative of JOHN FAHEY at scheduled periods to check for any signs of deterioration in the materials or functioning of the existing/constructed system. The designated inspector appointed by JOHN FAHEY shall perform informal inspections, also identified herein as maintenance inspections. Informal inspection means the visual inspection of the onsite facilities by the inspector to detect any deterioration of the facilities.

During each inspection, a checklist of items, as defined in Part II, Section C - Inspection and Inspection Checklist, shall be used. The completed checklist shall be dated and signed by the inspector and appropriately filed by the owner.

This manual is intended as a guide for JOHN FAHEY and outlines the proper procedures for conducting routine operations and maintenance for the stormwater

management facilities. JOHN FAHEY shall appoint an individual or company who will perform the onsite inspections. If JOHN FAHEY changes the individual/company responsible for the inspections, a copy of this manual shall be given to the new inspector to maintain consistency of the inspection reports. A continuous record of the operations and maintenance of the facilities must be maintained. The designated inspectors list, found in Part II, Section B, lists the official and various contractors responsible for inspections. This section shall be updated periodically pending any changes to the list.

This section of the manual has been prepared to provide the Inspector with a simple and systematic method for inspecting, operating, and maintaining the stormwater management system. For the most part, the O&M for the facilities involves observation rather than evaluation. The following sections provide a step-by-step procedure to assist the Inspector in performing all duties in a rational and orderly manner. The Inspector must become familiar with the background information in Part I of this Manual.

Finally, prior to conducting an inspection or performing routine O&M, the Inspector must review the Tools and Equipment List (Part II, Section F), and the Inspections and Inspection Checklist (Part II, Section C) of this Manual. Each time an inspection reveals the need for maintenance, the Inspector shall notify JOHN FAHEY, who may hire a contractor to perform the work under the direction of a New Jersey Licensed Professional Engineer as needed. Each time maintenance is performed on the stormwater management facilities; the Inspector must record the incident and place a copy of the maintenance checklist on file. Inspections must be performed once every year and after each major storm event. Routine maintenance, as defined in Part II, Section D, shall be performed immediately after each inspection and each major storm event if required.

Designated Inspectors List

This Section must be updated periodically to reflect the name(s) and telephone number(s) of the Inspectors and Contractors who are appointed by JOHN FAHEY.

Inspectors

Telephone Number

Designated Contractor

Professional Engineer

WJH Engineering

(732) 223-1313

Officers

Inspection Checklist

1. Underground Detention System. The proposed underground detention systems shall be inspected on a regular basis during informal maintenance procedures and after major rainfall events of 1" or more. Additional regularly schedule inspections shall also occur by qualified personnel.

The inspection shall include the following:

Informal Inspection

- a. Inspect inlets and outlet control structures for soil, debris, and trash.
- b. Inspect pavement for signs of settling (depressions) and ponding.
- c. Inspect inlets for damage to curb and grates.

Regularly Scheduled Inspections

- a. All informal inspection items.
- b. Inspect manholes, inlets and outlet control structures for sediment, debris, and garbage.
- c. Inspect pipes for clogging by sediments.

The inspection checklist and log included in Appendix A and B should be copied and completed for required items every time an inspection is performed. In general, informal inspections should be performed every 2-4 weeks between March and November. After each inspection, maintenance operations shall be directed as necessary.

Operation and Maintenance Procedures

JOHN FAHEY is responsible for the maintenance of the stormwater management facilities on the subject site. There are three categories of maintenance: preventative maintenance, corrective maintenance, and aesthetic maintenance. Accordingly, each of the maintenance conditions will be determined during the annual inspection. This portion of the report also contains a section on technical guidance describing corrective action.

1. **Preventative Maintenance:** Preventative maintenance includes items and inspections of the site that could potentially damage the functioning of the onsite facilities. By preventing these actions from occurring, the life of the stormwater management facilities is increased. Preventative maintenance includes the following:
 - a. Grass shall be trimmed and mowed on a regular schedule between March and November. This will help to maintain a tightly knit turf and help prevent diseases, pests, and the intrusion of weeds. Grass shall not be allowed to grow more than 1 to 2 inches between cuttings as this may damage the grasses growing points and limit its continued healthy growth.
 - b. Trees, shrubs, and ground cover in the vicinity of all inlets discharging into the underground detention system shall be pruned and fertilized. Pest control measures shall also be implemented in these areas.

- c. Trash and debris which collect at inlets and the orifices of the outlet control structures are to be removed and disposed of on a regular basis. Removal of trash and debris will help prevent damage to vegetated areas and eliminate potential mosquito breeding habitats. Removal should occur during regularly scheduled annual inspections, after major storm events, and during the periodic maintenance of grassed areas and landscaping onsite. Disposal of trash and debris is to comply with all Local, County, State and Federal regulations.
 - d. During inspections, all accumulated sediment within the inlets shall be removed on a regular basis before such accumulation threatens the operation of the system. During the inspection periods, the depth of sediment shall be measured and if the sediment accumulates to the point where it affects the volume of the system, the sediment shall be removed. Disposal of sediment shall comply with all Local, County, State and Federal regulations. Only suitable disposal sites shall be utilized. Removal of sediments will also aid in the elimination of mosquito breeding habitats.
 - e. During wet weather periods, inspection shall occur to determine if clogging of the system is a problem. In addition, all grassed areas will be stabilized to prevent sediment from running off onto the pavement into onsite inlets.
 - f. The stormwater management system shall be inspected and maintained to prevent the ponding of water in areas such as open cans and bottles, debris and settlement accumulations and areas of ground settlement. These areas provide ideal environments for the breeding of mosquitos.
2. **Corrective Maintenance Procedures:** Corrective maintenance procedures are required on an emergency or non-routine basis and are used to correct any problems or malfunctions of the facilities and to restore the system back to its

intended operation. Corrective maintenance includes both minor and major procedures to ensure the functioning of the systems. Corrective maintenance procedures include the following:

- a. Sediment, debris, and trash within the inlets and within the stormwater management facilities shall be removed to prevent the volume and discharge capacity of the system from being affected.
- b. Structural damage to inlets, manholes, outlet control structures and the pipe conveyance system shall be repaired immediately. The damage to these systems dictates the immediacy of necessary repairs to ensure the continued function of the entire system.
- c. Should the outlet controls of the system become affected, any ponded water shall be removed. The system shall be repaired to restore it to its original designed condition. Portable pumps may be necessary to remove the ponded water temporarily until the system can be repaired.
- d. Evidence of excessive siltation and/or mosquito breeding shall necessitate the implementation of corrective measures to eliminate such problems. Qualified personnel such as the local Mosquito Extermination Commission shall accomplish extermination of mosquitoes immediately. If mosquito control cannot be handled through preventative measures alone, the maintenance program shall be re-evaluated to place more emphasis on the control of mosquito breeding habitats.
- e. Where a re-seeding preventative maintenance program has not been effective in maintaining a non-erosive vegetative cover, other measures shall be initiated to prevent further loss of soil and any subsequent danger to the

stability of the facility. Alternative methods and materials to control erosion include riprap, gabion lining, sod, seeding, concrete lining and re-grading.

- f. Snow and ice accumulation can threaten the functioning of the entire system. Snow and ice shall be removed from critical areas to assure the continued functioning of the facility during winter months.
 - g. All stormwater management system components that will trap debris and sediment shall be inspected for clogging and excessive debris and sediment accumulation a minimum of four times annually, as well as, after all storms exceeding 1 inch of rainfall. Sediment removal shall be performed when the basin is totally dry. Debris, trash, sediment, and other waste material shall be disposed of at approved disposal/recycling sites in compliance with all applicable local, state, and federal waste regulations.
3. Aesthetic Maintenance Procedures. Aesthetic Maintenance Procedures include the upkeep of the onsite surroundings to ensure the facility has maintained an aesthetic appeal to the surrounding areas.

Checklists for the maintenance and corrective maintenance needed for the onsite facilities are enclosed within Appendices A and B. These should be filled out and filed by the owner when maintenance procedures are required for the onsite facilities. Checklists are generic in nature and should only include those items that are necessary for the maintenance of the onsite facilities.

Inspection and Maintenance Schedule

The following schedule shall be the minimum requirements for inspections:

Table '2.E' - Inspection and Maintenance Schedule	
TIME OF YEAR	TYPE OF INSPECTION
MARCH THRU MAY	REGULAR INSPECTION OF STORMWATER FACILITIES
MARCH THRU NOVEMBER	REGULARLY SCHEDULED LANDSCAPING MAINTENANCE PERIODS
SEPTEMBER THRU NOVEMBER	REGULAR INSPECTION OF STORMWATER FACILITIES

Additionally, to the inspection schedule listed above, the stormwater management detention systems shall have informal (maintenance) inspections performed after significant storm events of 1" of rain or more on the site.

Maintenance items required shall be completed as soon as possible after the item is identified for repair with consideration given to the type of repair necessary (preventative, corrective, or aesthetic). Items under preventative maintenance shall be performed during routine maintenance of the site to ensure that the onsite systems are free of sediments, debris, and garbage so that they continue to function in the appropriate manner.

Maintenance Tools and Equipment

The following is a list of required inspection equipment for routine O&M procedures and inspections.

1. Clipboard, pencil, and the inspection checklist - the inspection checklist is included in Appendix A.
2. A standard 6-foot collapsible ruler.
3. A camera - photographs or observed portions of the facilities will provide a measure of performance when comparing past and present maintenance practices or conditions.
4. A flashlight - a flashlight can be used to observe the inside of the inlets onsite.

The following is a list of tools and machinery that are typically required to maintain a Stormwater Management facility.

1. Grass Maintenance Equipment
 - a. Tractor Mounted Mowers
 - b. Riding Mowers
 - c. Hand Mowers
 - d. Gas Powered Trimmers
 - e. Gas Powered Edgers
 - f. Seed Spreaders
 - g. Fertilizer Spreaders
 - h. De-thatching Equipment
 - i. Pesticide and Herbicide Application Equipment
 - j. Grass Clipping and Leaf Collection Equipment
2. Vegetative cover maintenance equipment
 - a. Saws
 - b. Pruning Shears
 - c. Hedge Trimmers
 - d. Wood Clippers
3. Transportation Equipment
 - a. Trucks for transportation of materials
 - b. Trucks for transportation of equipment
 - c. Vehicles for transportation of personnel
4. Debris Trash and Sediment Removal Equipment
 - a. Loader
 - b. Backhoe
 - c. Grader

5. Miscellaneous Equipment
 - a. Shovels
 - b. Rakes
 - c. Picks
 - d. Wheel barrel
 - e. Painting Equipment
 - f. Gloves
 - g. Standard Mechanics Tools
 - h. Tools for maintenance of equipment
 - i. Office space
 - j. Office equipment
 - k. Telephones
 - l. Safety equipment
 - m. Tools for concrete (mixers, forms, etc.)
6. Materials
 - a. Topsoil
 - b. Fertilizer
 - c. Seed
 - d. Soil amendments (fertilizer, lime, etc.)
 - e. Chemicals (pesticides, herbicides)
 - f. Mulch
 - g. Paint
 - h. Paint removers
 - i. Spare parts for equipment
 - j. Oil and grease for equipment
 - k. Concrete

Maintenance Costs

In order to properly implement a stormwater management facilities maintenance plan, the costs associated with the maintenance procedures must be budgeted into the overall design of the system. Appendix E provides general costs associated with the necessary equipment needed to maintain the system properly. In addition, the cost of the labor, in man-hours, is provided to budget the amount of time necessary to implement the maintenance procedures.

APPENDIX A

SWM MAINTENANCE WORK ORDER AND CHECKLIST

Maintenance Work Order and Checklist
for
Stormwater Management Facilities

Name of Facility: _____
 Location: _____ Date: _____
 Crew: _____ Work Started: date _____ time _____
 Equipment: _____ Work Completed: date _____ time _____
 Weather: _____ Total Manhours of Work: _____

A. Preventative Maintenance

Work Item	Items Required (√)	Items Done (√)	Comments and Special Instructions
1. Grass Cutting			
A. Bottoms			
B. Embankments and Side Slopes			
C. Perimeter Areas			
D. Access Areas and Roads			
E. Other:			

2. Grass Maintenance

A. Fertilizing			
B. Re-Seeding			
C. De-Thatching			
D. Pest Control			
E. Other:			

3. Vegetative Cover

A. Fertilizing			
B. Pruning			
C. Pest Control			
D. Other:			

4. Trash and Debris Removal

A. Bottoms			
B. Embankments and Side Slopes			
C. Perimeter Areas			
D. Access Areas and Roads			
E. Inlets			
F. Outlets and Trash Racks			
G. Other:			

Work Item	Items Required (√)	Items Done (√)	Comments and Special Instructions
5. Sediment Removal			
A. Inlets			
B. Outlets and Trash Racks			
C. Bottoms			
D. Other:			
6. Mechanical Components			
A. Valves			
B. Sluice Gates			
C. Pumps			
D. Fence Gates			
E. Locks			
F. Access Hatches			
G. Other:			
7. Elimination of Potential Mosquito Breeding Habitats			
8. Pond Maintenance			
A. Aeration Equipment			
B. Debris and Trash Removal			
C. Weed Removal			
D. Other:			
9. Other Preventative Maintenance			
A.			
B.			
C.			

B. Corrective Maintenance

Work Item	Items	Items	Comments and Special Instructions
	Required (√)	Done (√)	
1. Removal of Debris & Sediment			
2. Structural Repairs			
3. Dam, Embankment & Slope Repairs			
4. Dewatering			
5. Pond Maintenance			
6. Control of Mosquitoes			
7. Erosion Repair			
8. Fence Repair			
9. Elimination of Trees, Brush, Roots & Animal Burrows			
10. Snow & Ice Removal			
11. Other			

C. Aesthetic Maintenance

Work Item	Items	Items	Comments and Special Instructions
	Required	Done	
1. Graffiti Removal	(√)	(√)	
2. Grass Trimming			
3. Weeding			

Remarks (Refer to Item No. , If Applicable):

Work Order Prepared By: _____
Work Completed By: _____

APPENDIX B

SWM MAINTENANCE LOG

Location:

Date:

[illegible]

(√) Completed

[illegible][illegible][illegible][illegible]

5. Sediment Removal

[illegible]

6. Mechanical Components

[illegible]

7. Elimination of Potential Mosquito

Breeding Habitats

[illegible]

8. Pond Maintenance

[illegible]

9. Other Preventative Maintenance

[illegible]

B. Corrective Maintenance

Work Item

- ## 1. Removal of Debris and Sediment

[illegible]

- ## 2. Structural Repairs

[illegible]

- ### 3. Dam, Embankment & Slope Repairs

[illegible]

- #### 4. Dewatering

[illegible]

- ## 5. Pond Maintenance

[illegible]

- ## 6. Control of Mosquitoes

[illegible]

- ## 7. Erosion Repair

[illegible]

- ## 8. Fence Repair

[illegible]

- ## 9. Elimination of Trees, Brush, Roots & Animal Burrows

[illegible]

- ## 10. Snow & Ice Removal

[illegible]

11. Other

[illegible]

C. Aesthetic Maintenance

Work Item

1. Graffiti Removal

--	--	--	--	--	--	--	--	--	--

2. Grass Trimming

--	--	--	--	--	--	--	--	--	--

3. Weeding

--	--	--	--	--	--	--	--	--	--

4. Other:

--	--	--	--	--	--	--	--	--	--

Remarks (Refer to Item No. , If Applicable):

APPENDIX C

SWM INSPECTION CHECKLIST

Inspection Checklist
for
Stormwater Management Facilities

Name of Facility _____

Location: _____ Date: _____

Weather: _____

Facility Item	O.K. ¹	Routine ²	Urgent ³	Comments ⁴
1. Embankments and Side Slopes				
A. Vegetation				
B. Linings				
C. Erosion				
D. Settlement				
E. Sloughing				
F. Trash and Debris				
G. Seepage				
H. Aesthetics				
I. Other:				

2. Bottoms (Detention and Infiltration)

A. Vegetation				
B. Erosion				
C. Standing Water				
D. Settlement				
E. Trash and Debris				
F. Sediment				
G. Aesthetics				
H. Other:				

3. Low Flow Channels (Detention)

A. Vegetation				
B. Lining				
C. Erosion				
D. Settlement				
E. Standing Water				
F. Trash and Debris				
G. Sediments				
H. Other:				

Facility Item	O.K. ¹	Routine ²	Urgent ³	Comments ⁴
4. Ponds (Retention)				
A. Vegetation				
B. Shoreline Erosion				
C. Aeration Equipment				
D. Trash and Debris				
E. Sediment				
F. Water Quality				
G. Other:				
5. Inlet Structure				
A. Condition of Structure				
B. Erosion				
C. Trash and Debris				
D. Sediment				
E. Aesthetics				
F. Other:				
6. Outlet Structure (Detention & Retention)				
A. Condition of Structure				
B. Erosion				
C. Trash and Debris				
D. Sediment				
E. Mechanical Components				
F. Aesthetics				
G. Other:				
7. Emergency Spillway				
A. Vegetation				
B. Lining				
C. Erosion				
D. Trash and Debris				
E. Other:				
8. Perimeter				
A. Vegetation				
B. Erosion				
C. Trash and Debris				
D. Fences and Gates				
E. Aesthetics				
F. Other:				
9. Access Roads				
A. Vegetation				
B. Road Surface				
C. Fence and Gates				
D. Erosion				
E. Aesthetics				
F. Other:				

Facility Item	O.K. ¹	Routine ²	Urgent ³	Comments ⁴
10. Miscellaneous				
A. Effectiveness of Exist. Maint. Program				
B. Dam Inspections				
C. Potential Mosquito Habitats				
D. Mosquitoes				
E.				
F.				
G.				

¹ The item checked is in good condition and the maintenance program is adequate.

² The item checked requires attention, but does not present an immediate threat to the facility function or other facility components.

³ The item checked requires immediate attention to keep the facility operational or to prevent damage to other facility components.

⁴ Provide explanation and details if columns 2 or 3 are checked.

Remarks (Refer to Item No. If Applicable):

Inspector: _____

APPENDIX D
SWM INSPECTION LOG

Name of Facility: _____
Location: _____

[illegible]

Indicate Condition (i.e. 1, 2 or 3)

[illegible][illegible][illegible]

[illegible][illegible][illegible][illegible][illegible]

SWM Inspection Log
Facility Item

Page 3 of 3

9. Access Roads

A. Vegetation										
B. Road Surface										
C. Fence and Gates										
D. Erosion										
E. Aesthetics										
F. Other										

10. Miscellaneous

A. Effectiveness of Exist. Maint. Program										
B. Dam Inspections										
C. Potential Mosquito Habitats										
D. Mosquitoes										
E.										
F.										
G.										

¹ The item checked is in good condition and the maintenance program is adequate.

² The item checked requires attention, but does not present an immediate threat to the facility function or other facility components.

³ The item checked requires immediate attention to keep the facility operational or to prevent damage to other facility components.

Remarks (Refer to Item No. If Applicable):

APPENDIX E
SWM MAINTENANCE COSTS

Cost Data SWMF Maintenance Equipment and Material Costs			October 2021
Grass Maintenance Equipment			
	Purchase	Rent (Per Day)	
Hand Mower	\$300-\$500	\$25-\$40	
Riding Mower	\$3,000-\$5,000	\$75-\$100	
Tractor Mower	\$15,000-\$20,000	\$100-\$300	
Trimmer/ Edger	\$200-\$500	\$25-\$35	
Spreader	\$100-\$200	\$20-\$30	
Chemical Sprayer	\$200-\$500	\$25-\$40	

Vegetative Cover Maintenance Equipment		
	Purchase	Rent (Per Day)
Hand Saw	\$15	\$5
Chain Saw	\$300-\$500	\$15-\$35
Pruning Shears	\$25	\$5
Shrub Trimmer	\$200	\$25-\$35
Brush Chipper	\$1,000-\$5,000	\$50-\$150

Transportation Equipment			
	Purchase	Lease (per month)	Rent (Per Day)
Van	\$10,000-\$15,000	\$400	\$50-\$70
Pickup Truck	\$10,000-\$15,000	\$400	\$50-\$70
Dump Truck	\$30,000-\$50,000	\$1,200	\$75-\$150
Light Duty Trailer	\$3,000-\$5,000	\$150	\$30-\$50
Heavy Duty Trailer	\$10,000-\$20,000	\$500	\$100-\$200

Debris, Trash and Sediment Removal Equipment			
	Purchase	Lease (per month)	Rent (Per Day)
Front End Loader	\$50,000-\$100,000	\$1,500-\$2,000	\$200-\$400
Backhoe	\$30,000-\$50,000	\$1,200	\$150-\$300
Excavator	\$100,000+	\$2,000+	\$400-\$1,000
Vacuum Truck	\$100,000+	\$2,000+	\$400-\$1,000

Miscellaneous Equipment		
	Purchase	Rent (Per Day)
Shovel	\$15	\$5
Leaf Rake	\$15	\$5
Soil Rake	\$15	\$5
Pick	\$15	\$5
Wheelbarrow	\$100-\$200	\$10
Gloves	\$5	N/A
Portable Compressor	\$500-\$1,000	\$50-\$100
Portable Generator	\$500-\$1,000	\$50-\$100
Concrete Mixer	\$500-\$1,000	\$25-\$50
Welding Equipment	\$500-\$1,500	\$35-\$70

Materials	
	Purchase
Topsoil	\$35/Cubic Yard
Fill Soil	\$15/Cubic Yard
Grass Seed	\$5/Pound
Soil Amenities (Fertilizer, Lime, etc.)	\$0.05/sq.ft.
Chemicals (Pesticides, Herbicides, etc.)	\$10/gallon
Mulch	\$25/Cubic Yard
Paint	\$20/gallon
Paint Remover	\$10/gallon
Machine/Motor Lubricants	\$5/gallon
Dry Mortar Mix	\$4/50 pound bag
Concrete Delivered to Site	\$60-\$100/Cubic Yard

Notes:

1. Estimated equipment costs are based upon Industrial/Commercial grade equipment
2. The cost estimates presented above are intended for general planning and comparison purposes. See text for information regarding the basis of the cost estimates, instructions regarding their recommended use, and procedures for developing more specific cost estimates where necessary. Owner shall confirm all estimated costs.
3. See CHAPTER FOUR - MAINTENANCE EQUIPMENT AND PROCEDURES for additional information on SWMF maintenance equipment and materials.

Cost Data		
Costs of SWMF Maintenance Tasks		October 2021
Preventative Maintenance Tasks (Values expressed in Man-Hours)		
	Small Facility	Large Facility
Grass Cutting	1	1-2
Grass Maintenance	0.5	1
Trash & Debris Removal	0.5	1
Sediment Removal	4	8
Mobilization	1	1
Inspection & Reporting	1	2

Corrective Maintenance Tasks (Values expressed in Man-Hours)		
	Small Facility	Large Facility
Trash & Debris Removal	4	8
Structural Repairs	24	40
Dewatering	4	80
Mosquito Extermination	1	2-4
Erosion Repair	4	8
Fence Repair	2-4	4-8
Snow & Ice Removal	1	2
Mobilization	2	2

Aesthetic Maintenance Tasks (Values expressed in Man-Hours)		
	Small Facility	Large Facility
Grass Trimming	0.5	2
Weed Control	0.5	2
Landscape Maintenance	1-2	2-4
Graffiti Removal	2-4	4-8

Notes:

1. Facility Size Definitions:

Small Facility: Total SWMF Site Area $\frac{1}{4}$ Acre

Large Facility: Total SWMF Site Area 1 Acre

Appropriate adjustments to the cost estimates presented above should be made as necessary to account for actual SWMF size. See text for further information.

2. Cost estimates are presented in terms of man-hours. These values should be used in conjunction with applicable personnel rates to determine labor costs for a specific program or facility.
3. The cost estimates presented above are intended for general planning and comparison purposes. See text for information regarding the basis of the cost estimates, instructions regarding their recommended use, and procedures for developing more specific cost estimates where necessary. Owner shall confirm all estimated costs.
4. See CHAPTER FOUR - MAINTENANCE EQUIPMENT AND PROCEDURES for detailed information regarding SWMF maintenance tasks listed above.