

INTEGRATED PEST MANAGEMENT PLAN

FOR

**Green Cove Park
2200 Cooper Point Road
Olympia, WA**

OWNER

**Green Cove Park LLC
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Completed By

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Introduction

The project known as Green Cove Park is a 181-lot subdivision located in Olympia, WA. The site is currently an inactive surface mine. Mining ceased in 2005 when the property was obtained by our client, Green Cove Park, LLC.

Definitions

Integrated Pest Management Plan (IPMP) is a plan designed to manage pests and the toxic chemicals used for their control to alleviate pest problems with the least possible hazard to people, property and the environment.

Pest is defined as unwanted animals, diseases, plants, materials, or organisms' intrusion into the development that is desired to be controlled.

Background

With any urban development the potential from contamination to area lakes, streams and groundwater supplies is increased through the construction of homes, streets, and introduction of people.

The majority of Thurston County has been classified as a Critical Aquifer Recharge Area by the County Health Department. Residents of these areas receive their drinking water from these recharge areas. Activities from new construction can impact the water supply.

The project of Green Cove Park is located within one of these areas as identified by County Health. As a requirement for project approval Health requires the development of this Integrated Pest Management Plan (IPMP).

The IPMP will address potential sources of contamination of both surface and groundwater.

The Integrated Pest Management Plan (IPMP) is the coordinated use of pest and environmental information to design and implement pest control methods that are economically, environmentally and socially sound. IPM promotes prevention over remediation. IPM Plan is a plan that establishes a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks.

This IPM plan seeks to:

1. Recognize these possible contaminants.
2. Recognize the critical natural habitats.
3. Recognize pests that may affect the structures designed to control these contaminants.
4. Assist residents and professional landscapers by describing maintenance practices that are the least damaging to the environment.
5. Recognize responsible parties for implementation of these strategies

Pest management strategies may include education, exclusion, sanitation, maintenance, biological and mechanical controls, and site appropriate pesticides.

Project Description

This project will subdivide 4 existing parcels into 181 single family residential lots, with associated wetlands, buffers, roadways, storm and tree preservation tracts. Public utilities will be provided by the City of Olympia (the City). The project has been designed to meet or exceed the requirements of the City.

According to Thurston County Health Department (Health), the project site is within a high Critical Aquifer Recharge Area (CARA). Health determines the risk using soil mapping provided by USGS. Mapped soils are classified as Alderwood series however due to the past usage of the site native soils are no longer present on site and have been replaced with fill in most areas.

Existing and Proposed Site Features

1) Natural

- **Ground Water**

Most of Thurston County is classified as aquifer sensitive area. This means most of the potable water consumed in this area comes from this aquifer.

Due to the removal of native soils through the past mining history, and according to the Hydrogeological Report prepared by Earth Solutions North West, this site is no longer contributing to the aquifer. However, Low Impact Development (LID) measures have been proposed to introduce water back into the aquifer where possible through the use of amended soils, perforated pipes and dispersion to name a few.
- **Wetlands**

There are 3 mapped Category III and 2 Category IV wetlands on site. No Construction activities are proposed for the wetlands. Planting of trees and vegetation is proposed within the associated buffers
- **Streams**

There are no streams within the project site.
- **Lakes**

There are no lakes within the project site.
- **Natural Habitat**

The project has no known critical habitat

2) Man Made

A. Mining Operation:

- Onsite Sewage System (OSS)
One complete OSS and one mound drainfield serving an adjacent property are located on site. Both the system and drainfield are proposed for decommissioning in accordance with Health regulations. The offsite property will be hooked to sewer as part of site development.
- Individual Well
One domestic well is located on site and is proposed for decommissioning in accordance with Health regulations at site development.

B. Stormwater System:

A typical Stormwater system is divided into three parts. The first is the conveyance system the second is the treatment and the final is disposal. Maintaining all three are necessary to assure the system is working as designed.

- Stormwater Conveyance System.
Storms can wash the containments that build up on streets, roofs and lawns into unprotected areas. The free movement of the water is important so a build up of concentration does not occur in areas that are not designed to receive these containments. Keeping ditches, catch basins, and stormwater piping clean will assure a controlled and predictable flow of contaminated water to the correct receiving facility.
- Stormwater Wet Pond.
The created ponds for a stormwater system, treat, store and dispose of stormwater. The wet pond receives the water first and will remove **many (but not all)** contaminates through a natural process. The water entering the pond should be a steady flow without disruptions. Deadly chemicals can hinder the natural treatment process and need to be avoided. These chemicals should be controlled at the source.
- Stormwater Retention Pond.
The final pond is used to store water for a slow infiltration back into the ground. It is important that the bottom of the pond remain in a natural state. Compacting or silting can change or stop the rate of infiltration into the ground. Digging or disturbing the soil can create a fast infiltration rate which would not allow enough time for the final treatment process of the water. The berms at the top of the ponds should be mowed on a regular basis.

Gravity Sewer System.

The sewage is handled through a gravity pipe flowing into a sewer lift station. This lift station pumps the effluent into the cities sewer system. Placing rags, bottles, or other debris into the system will clog or destroy the collection and/or the pumping system. The city treatment facility is a natural biological degrading process. Dumping harmful chemicals into the system can create foul smells as well as destroy this biological process and force untreated water into sensitive areas.

Best Management Practices

General

This section deals with identifying possible contaminants, their source, the items that may be affected by their misuse, and suggestions on proper prevention of contamination. The house hold has an unlimited amount of possible harmful contaminants, some which are good in some uses, harmful in others, and some are not normally seen as problems. An example of material not normally considered a problem is top soil. Top soil is washed into catch basins by storms or hosing down driveways, which then clogs the system.

Prevention – the best line of defense. Prevention provides the best line of defense against pest problems and is the least costly. Many pest problems in landscaping can be avoided by selecting plants with known pest resistance and avoiding plants that are known to be susceptible to pest problems.

The tables below are divided into common activities.

Table 1

Automobile and Equipment Repairs and Cleaning	
Typical Products and/or Contaminates	Oil, Waxes, Solvents, Antifreeze, Fuel, Greases
General Comments	Most of these products are oil base and not designed to be exposed to living organisms.
Areas of Concerns	<p>1) Stormwater Wet Pond: These chemicals may kill off the natural plant growth. The grasses within the wet pond filter out floatable contaminants while plants use a natural biological process to dissolve them.</p> <p>2) Asphalt Oils will degrade the asphalt and cause additional oils and chemical to migrate into the stormwater system.</p> <p>3) Landscaping Most of these products will kill plants, which will increased the need for using fertilizers. Plant growth is used to compensate for the areas of dead plants. This concentrated chemical use increases the possibility of groundwater contamination.</p> <p>4) Natural Elements Most of automobile products are harmful to the environment. The heavier oils can be trapped by grasses and soils, but the thinner materials can travel greater distances killing plants and animals that may digested them.</p> <p>Extremely small amounts can contaminate a large portion of the aquifer.</p>
Best Management Practices	<p>Wash cars using soaps that are environmentally sensitive and only in small amounts. When possible use commercially constructed car washes. These facilities are designed to handle the soaps and, as a bonus, recycle water.</p> <p>Use proper storage containers for oils and fuels. Store only the amount needed in the near future. If a spill occurs, use commercially provided products to soak up the chemical and dispose of the used product properly.</p> <p>Use environmentally sensitive Anti-freeze. Some anti-freezes are attractive to animals, but are extremely poisonous.</p>
Responsible Parties	The individual land owners are responsible for managing the automobile and equipment repairs and cleaning items within their property.

Table 2

Home Repairs, Remodeling, and Hobbies	
Typical Products and/or Contaminates	Paint, Paint thinners, Cement, Adhesive, Strippers, Caulking, Roof Tar and Roof Sealants, Cleaners, Gutter cleanings. Swimming Pool and Hot Tub Chemicals, Inks and Dyes.
General Comments	These products are usually designed to stop organism growth. Those that do not have a specific additive to control organisms are usually inherently poisonous.
Areas of Concerns	1) Stormwater Wet Pond: The chemicals may kill off the natural growth. 2) Stormwater Conveyance and Retention Pond Material from gutters will clog catch basins, settle in conveyance piping and will migrate and settle in the stormwater retention pond inhibiting its ability to infiltrate the water. 3) Landscaping Most of these products will kill plants, which will increased the use of fertilizer. Plant growth is used to compensate for the areas of dead plants. This concentrated chemical use increases the possibility of groundwater contamination. 4) Natural Elements Many of household repair materials are extremely dangerous to the user and the environment. 5) Sewer System Most of these materials are designed to inhibit or stop natural growth. The sewer system depends on naturally occurring organisms to treat wastewater. These chemicals will destroy this natural process.
Best Management Practices	Read labels carefully; adhere to the safety recommendations, buy quantities that will be used in the project or in the near future, dispose of the excesses properly and immediately after completion. If storing is required, use only original product containers, or containers specifically designed to hold that chemical for long periods of time and are non breakable. Many of these chemical will dissolve certain plastics and metals. Do not dispose of excess chemicals into the sewer or stormwater system.
Responsible Parties	The individual land owners are responsible for managing the home repairs, remodeling and hobbies items within their property.

Table 3

	Household Cleaning
Typical Products and/or Contaminates	Oven Cleaners, Drain decloggers, Soaps, Degreasers, Carpet spot removers, Window cleaners, Floor waxes and cleaners, Toilet cleaners, Air fresheners, bathtub cleaners
General Comments	Most household cleaners are not dangerous to people and are meant to be environmentally sensitive however; many have fungicides or other organism inhibitors to keep growth from reoccurring.
Areas of Concerns	1) Natural Elements Only the harshest of the household cleaning agents are dangerous to natural organisms, unless put in heavy concentrations. Some, like oven cleaners, are extremely harsh and are dangerous to people as well as plants and animals. 2) Sewer System Excessive concentration can overwhelm natural organisms causing a slowing or stoppage of biological action.
Best Management Practices	Read labels carefully and purchase only environmentally sensitive products. Use them in the proper quantities and according to the manufactures recommendations. Do not dispose of excess products into the sewer system or the stormwater system.
Responsible Parties	The individual land owners are responsible for managing the household cleaning products within their property.

Table 4

Pesticides	
Typical Products and/or Contaminates	Insecticides, Wood preservatives, Moss inhibitors, Fungicides,
General Comments	These products are specifically designed to kill organisms. The product should be used only in the manner specifically designed.
Areas of Concerns	<p>1) Stormwater Wet Pond: These chemicals will inhibit the treatment ability of the pond by killing off the natural growth of the wetland.</p> <p>1) Natural Elements Plants and animals can be killed by small amounts of these products.</p> <p>2) Sewer System The sewer system depends on naturally occurring organisms to treat wastewater. These chemicals will destroy this natural process.</p>
Best Management Practices	<p>Know the pests you are trying to control. Insecticides should only be used when the level of infestation poses a threat to the life of the host plant. Explore cultural means of controlling the insect by modifying the environment that may favor its present.</p> <p>Read labels carefully; purchase only environmentally sensitive products. Use them in proper quantities and according to the manufactures recommendations.</p> <p>Do not dispose of excess products into the sewer system or the stormwater system.</p> <p>If storing is required, use only original product containers, or containers specifically designed to hold that chemical for long periods of time and are non breakable.</p>
Responsible Parties	The individual land owners are responsible for managing the pesticides within their property.

Table 5

Assorted Objects	
Typical Products and/or Contaminates	Soil, Compost, Gravel, Diapers,
General Comments	These items are not generally thought of as being contaminates but have the ability to disrupt the design systems.
Areas of Concerns	1) Stormwater System Soil, compost, and gravel is washed down into the catch basins, through the piping and into the ponds. Each of these parts may be damaged or clogged by excess material. 2) Sewer System The sewage flows through pipes into a pump station. Debris such as rags, diapers, etc. will clog pipes and pumps.
Best Management Practices	Do not wash soils and debris into the stormwater system. Sweep and dispose of through the appropriate methods. Use the appropriate silt fencing when building or re-building landscaping to keep runoff contained within the project limits. Do not dispose of non-biodegradable material in the sewer system.
Responsible Parties	The individual land owners are responsible for managing the assorted items within their property.

Table 6

Landscaping	
Typical Products and/or Contaminates	Fertilizers, Weed Control Products, Pesticides
General Comments	<p>Landscaping is the greatest concern of pest control. The “Best Management Practices” portion of this table is further broken down to better manage contaminates in landscaping.</p> <p>Selecting indigenous plants provide the owner with the best line of defense against pests, since most of these plants are resistant to local pest populations. Information regarding Noxious Weeds is available at http://www.co.thurston.wa.us/tcweeds/factsheets.htm</p>
Areas of Concerns	<p>1) All Systems</p> <p>Landscaping includes all forms of contamination. The method of constructing and maintaining lawns and gardens can create problems in the entire ecosystem.</p>
Best Management Practices	<p>Surveying:</p> <p>Homeowners should establish a schedule for systematically surveying their landscape for pests and damage symptoms. This is an important activity, and should be preformed on a regular basis. By performing regular surveys, potential pest problems are controlled much easier than if the given pest has time to propagate and spread to other locations. This inspection is equally important within the common areas of Green Cove Park, since pest populations can spread long distances, and by a variety of means. Individual homeowners within Green Cove Park should come to a consensus on the responsibility of the commons areas. Often, it is in the best interest of the Homeowner’s Association to hire a professional to regularly inspect common areas. Surveys should be more frequent in Spring and Summer months, which are the principle times for pest activity.</p>

Table 6 Cont.

<p>Best Management Practice Continued.</p>	<p>Identification:</p> <p>Proper identification of the pest or symptom affecting a given plant or plants is an essential step before determining the proper control action. Homeowners should take responsibility to familiarize themselves with the common indicators of pest problems, and/or consult with a professional. There are several professional resources within the community to aid in the identification pests. Landscape contractors, nursery professionals and the Master Gardeners at the WSU Cooperative Extension Office are all valuable resources that can identify pests and recommend appropriate control methods based upon their expertise. Often, providing a portion of the plant that displays the symptom to one of these professionals allows them a visual indicator. This results in a more accurate assessment than just a verbal description. Although they should not be relied upon alone, reference books also provide another valuable resource in diagnosing or identifying a potential pest problem. Before applying any control methods, the homeowner or professional must determine whether action is needed or is likely to be effective. Affected plants should be evaluated in terms of their value in the landscape. It is possible that the value of the plant is much less important and could be replaced with less effort than chemical application. It may be too late for a control to be effective, or the problem may be minor. In some situations, no action may be the best alternative. If action is needed, control methods can be used individually or in combination. Priority should always be given to non-chemical methods.</p> <p>Action Thresholds:</p> <p>Many pests do not actually kill plants but simply make them unsightly. In a residential landscape setting, the individual homeowner makes decisions as to what is unacceptable damage due to pest activity, at which time some form of control seems necessary. This point may be reached sooner for a favorite plant in a conspicuous location. The action threshold will certainly vary from homeowner to homeowner. However, in commons areas within Green Cove Park, this decision is not as easy. What might be acceptable to one homeowner might not be acceptable to others. It is encouraged during monthly meetings that this issue be discussed and an action threshold be established by group consensus. Professional judgment will be most useful in these discussions. The professional will have the ability to provide an assessment of the existing state of the common areas and recommend management practices for the future. This will dictate the point at which some level of control be taken for the collective good of the development.</p>
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Table 6 Cont.

<p>Best Management Practice Continued</p>	<p>Evaluating Treatment Strategies</p> <p>Determining the success of a given treatment is essential in any modification of the IPMP. Comprehensive records should be kept by the chosen professional for all areas of management. Complete records will be kept for all treatment strategies in order to evaluate both short and long term success.</p> <p>Information to be recorded will include:</p> <ul style="list-style-type: none">• Identification of the pest;• Location and size of affected areas;• Recent weather including rainfall and temperature;• Previous control methods;• Control method to be implemented;• Dates of implementation;• Observed changes in condition after treatment. <p>Such detailed record keeping will aid subsequent landscape professionals in fine-tuning treatment strategies.</p> <p>Residential Development Construction</p> <p>Adequate site preparation is essential for the successful implementation of the IPMP. Upper layers of topsoil should be removed from foundation and road areas, and stockpiled. This topsoil may then be reapplied to homesites and common areas as needed. In areas with little or no topsoil, soil amendments such as compost or well aged manure should be added in a layer between 6 and 12 inches thick. This organic material should then be tilled into the soil thoroughly. The added organic material will serve to enrich the nutrient value of the soil, retain moisture, and filter impurities.</p> <p>In areas with existing noxious weed species such as Scots' broom and Himalayan blackberry, plants will be removed to an off-site dump. These plants will be mechanically pulled prior to excavation to remove as much of the below ground root system as possible. Contractors conducting site work should be mindful of cleaning their equipment prior to completing their work. Plant matter from noxious weeds can be spread from site to site on this manner.</p>
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Table 6 Cont.

<p>Best Management Practice Continued</p>	<p>Irrigation Practices</p> <ul style="list-style-type: none">• Irrigation systems should be properly adjusted to only watering plants.• Watering should occur during early morning hours to reduce evaporative losses and minimize fungal problems in turf grasses.• During extreme drought conditions, watering will be restricted to priority plantings such as trees and shrubs. <p>Common areas will be subject to the same water restrictions as individual home owners. In both cases, irrigation systems must be well adjusted and apply water only to plants, not pavement.</p>
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Table 6 Cont.

<p>Best Management Practice Continued</p>	<p>Fertilizing Options</p> <p>All plants need a supply of nutrients in addition to light, air, and water. Plants require several different nutrients to be present in the soil for proper growth and development. Three main elements are responsible for proper plant development: nitrogen, phosphorus, and potassium. Both organic mulches and commercial fertilizers contain these elements, as well as, several trace elements required by plants in much smaller quantities. As explained previously, excess irrigation and high rainfall is responsible for leaching these nutrients from the soil. A brief description of the three main elements follows:</p> <p><i>Nitrogen</i></p> <p>Nitrogen is the element needed in the greatest quantity by plants. All nitrogen used by plants comes from combinations of organic matter, air, and commercial fertilizers and is responsible for most of the visible growth of plants. Nitrogen is found in forms that are either immediately available to plants (soluble or quick release forms) or not immediately available to plants (insoluble or slow release). Due to the chemical nature of nitrogen, it is leached quickly and readily from the soil.</p> <p><i>Phosphorus</i></p> <p>Phosphorus is less mobile in most soils than nitrogen, but should be used sparingly to avoid overloading the soils or water with excess nutrient. Phosphorus is associated with root development in plants. The most effective method of applying a fertilizer containing phosphate is to concentrate it within the root zone.</p> <p><i>Potassium</i></p> <p>Potassium is an element also commonly referred to as Potash. Potassium aids in the flowering and fruiting of appropriate plants and aids in a plant's ability to withstand stress. Potassium can also be leached from the soil like nitrogen and phosphorus.</p>
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Table 6 Cont.

<p>Best Management Practice Continued</p>	<p>Organic Mulches</p> <p>Organic mulches such as barks and composts provide several advantages when compared to commercial fertilizers. The first advantage is that organic mulches provide a well-rounded nutrient source for most plant material and take the guesswork out of using the “right” combination of synthetic fertilizers. These mulches can be applied in fall and/or spring and release nutrients slowly to plants as they break down. This provides most plants with a year-round nutrient source. As organic mulches decompose, they add structure to soils and provide greater moisture retention, and help to regulate temperature extremes within the soil. The other benefit is that organic mulches slow the movement of water through the soil by their ability to absorb and retain water. For these reasons, organic mulches are the most preferable means of increasing nutrient levels within soil.</p> <p>Fertilizers</p> <p>Fertilizers should only be applied when it becomes evident that a nutrient deficiency exists. Organic mulches will provide adequate quantities of nutrients to plants in the majority of situations and should be applied before fertilizers are considered. Of the commonly applied fertilizers, applications of excess soluble nitrogen constitute the most serious risk to groundwater supplies and the nearby wetland. Commercial fertilizers come in a variety of formulas and forms. These fertilizers usually come in dry or liquid forms that are applied directly to the surface of the soil. These fertilizers can further be divided into quick and slow release formulas. Quick release fertilizers contain forms of nitrogen, phosphorus, and potassium that are readily available to plants. The advantage of this type of fertilizer is that a known nutrient deficiency can be corrected relatively quickly. However, quick release fertilizers should be used only in situations where a specific plant nutrient deficiency is evident. These types of fertilizers migrate quickly through the soil and provide little or no benefit to the plant if excess water is applied. Groundwater supplies used for drinking water may also be contaminated by readily available periods of active plant growth and only when a nutrient deficiency can be determined. In contrast, slow released fertilizers are also available. Slow release fertilizers are applied as little as once a year, ideally at the end of the rainy season. These fertilizers continuously break down, providing nutrients to plants year-round. For this reason, it is much more difficult for slow release fertilizers to migrate through soil into the groundwater.</p>
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Table 6 Cont.

<p>Best Management Practice Continued</p>	<p>Application Guidelines</p> <ul style="list-style-type: none">• Avoid needless applications of fertilizers. Mulching mowers return cut grass to the lawn and can provide up to 1.3 of the entire nitrogen requirement of the lawn. When fertilizing is appropriate, avoid heavy applications of quick release fertilizers, especially in lawn areas. Rather, consider the use of a natural lawn fertilizer. Natural lawn fertilizers are slow-release, require fewer applications and provide more uniform growth.• In lawn areas, apply lighter rates of fertilizer more often. This practice is much more effective than applying heavy rates less often. As an example, 1 pound of soluble nitrogen per 1,000 square feet applied once a month poses less risk to groundwater than 2 pounds of soluble nitrogen per 1,000 square feet applied every two months. In heavy fertilizer applications, the high infiltration rates of the soils in this area allow excess leaching of fertilizer. The majority of quick release fertilizers move below the root zone of plants so quickly that plants do not benefit.• To fertilize a lawn properly, it is important to first determine the square footage of the lawn area to be fertilized. Once the square footage of lawn areas has been established, a good rule of thumb is to apply 1 to 4 pounds of nitrogen per 1,000 square feet of lawn a year. Fertilizer labels can be confusing, so be sure to consult with a local nursery professional to help decipher how much actual nitrogen is contained within the specific fertilizer product. As a guideline, no more than 1.2 pound of soluble nitrogen per 1,000 square feet should be applied in any single application.• It is possible to maintain a healthy lawn by using a natural lawn fertilizer once a year in September. If fertilizing twice a year, an additional application should be made in May.• Avoid over-watering lawns immediately after applying fertilizer. A preferred alternative is to irrigate the lawn thoroughly a day or two before fertilizing; then water briefly after application – just enough to wash the fertilizer off the leaves and into the soil.• Do not use “weed and feed” type fertilizers, which contain pre-emergent herbicides on lawn areas.
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Table 6 Cont.

<p>Best Management Practice Continued</p>	<p>Weed Control</p> <p>Mechanical and cultural control methods are the preferred means of weed control within Green Cove Park. These methods include combinations hand pulling, tilling, installation of weed barriers, and application of organic mulch. These control methods are preferred to using herbicides, since herbicides may harm desirable plants and contaminate groundwater supplies. The wetland and its buffer should be monitored for in the invasion of noxious vegetation. If noxious weeds are found, they should be hand-pulled or cut to prevent the loss of desired species from competition. Irrigation and fertilization techniques confined to the needs of desirable plants help keep weed growth from becoming too invasive. Chemical weed control is only appropriate for homesites, and only in situations where mechanical and cultural means of control have been proven ineffective. If chemical weed control becomes appropriate, the following guidelines should be followed:</p> <ul style="list-style-type: none"> • Individual homesites should use Roundup brand herbicide. This product is one of few herbicides without lasting residues. • Applications should be timed to provide for best results. Always follow product label directions. • Applications should be made during windless periods at least 4 hours before probable rainfall, and early in the morning before the day heats up. • Do not use “weed and feed” type fertilizers, which contain pre-emergent herbicides on lawn areas. • Use of any other herbicides should be recommended and applied by a licensed professional, especially in common areas.
<p>Responsible Parties</p>	<p>The individual land owners are responsible for managing the landscaping items within their property.</p>

Table 7

Stormwater Ponds	
Typical Products and/or Contaminates	Fertilizers, Weed Control Products, Pesticides
General Comments	Maintaining the stormwater facilities should be completed by professionals who are knowledgeable in these type of facilities and how they work.
Areas of Concerns	1) Stormwater System Excessive growth, silted in bottoms, clogs, should be maintained on a regular basis.
Best Management Practices	Hire a professional landscaper to maintain the facility.
Responsible Parties	Home Owners Association.