# APPENDIX I

# Landscape Management Plans and Integrated Pest Management Plans

**Note:**
Some pages in this document have been purposely skipped or blank pages inserted so that this document will print correctly when duplexed.

# I-1. Landscape Management Plans

A landscape management plan (LMP) is a City approved plan for defining the layout and long-term maintenance of landscaping features to minimize the use of pesticides (including herbicides and fungicides) and fertilizers, and reduce the discharge of suspended solids and other pollutants. An approved LMP is allowed to be used as an alternative to the requirement to formally treat (with a water quality treatment BMP) the runoff from pollution generating pervious surfaces subject to water quality treatment. LMPs have the potential to significantly reduce the pollutant load washing off managed green spaces. Requirements for obtaining an approved LMP are summarized below.

LMPs must address the basic principles in *Volume 1, Section 7.8*, tailoring them to fit the specific site. Not every LMP may be able to apply each of the listed recommendations included in the basic principles. In addition, landscapes are managed for different purposes, some more formal than others. It may be that some recommendations will not be appropriate for very formal sites and thus not adopted, in favor of other management practices that better fit the uses for which the site is intended. In the end, the extent to which a LMP is successful depends on the ability of the practices chosen to retain soil, fertilizers, and pesticides on the site and away from receiving waters throughout the entire year.

If a LMP is proposed, it must be submitted with the engineering plans for the proposed project. The following documentation is required to evaluate a LMP submittal:

1) Site vicinity map with topography.
2) Site plan including topography, areas with saturated soils (if applicable), and high water tables (if applicable).
3) Narrative describing how the six basic principles in *Volume 1, Section 7.8* will be achieved.
4) Plant list (with both common and scientific names) that includes:
    a. Drought-tolerant plants, disease resistant varieties, species for attracting beneficial insects (if any) and native plants.
    b. Proposed spacing for shrubs and groundcovers.
    c. The grass mix or mixes planned for turf areas including sun/shade tolerance, disease susceptibility, drought tolerance, and tolerance of wet soil conditions.
5) Landscape plan indicating placement of landscape features, lawn areas, trees, and planting groups (e.g., forbs, herbs, groundcovers, etc.) on the site.
6) Signage plan including proposed locations of signs and content of signs.
    a. Signage shall be located to identify which areas are included in the LMP.
    b. Signage shall identify how a copy of the approved LMP can be obtained.

c. Basic educational information about the LMP for maintenance workers and the public is also encouraged to be included in the signage.

7) Information on soil preparation and fertility requirements.

8) Information on the design of the irrigation method (e.g., installed sprinkler system, drip irrigation system, manual, etc.)

9) Landscape maintenance plan, including the following:

a. Physical care methods, such as thatch removal or aeration, and mowing height and frequency

b. Type of fertilizer (including N-P-K strength) and fertilization schedule or criteria

10) Integrated Pest Management Plan (refer to *Section I-2*), including the following:

a. Type of chemicals to be used for common pests such as crane fly larvae, and the criteria or schedule for application

b. Any biocontrol methods.

11) Information about the storage of pesticides or other chemicals, and disposal measures that will be used, including the following:

a. How the chemicals will be stored on the site between applications to prevent contact with stormwater or spills into the drainage system (if applicable).

b. How excess quantities of fertilizers or chemicals will be handled for individual applications.

12) Implementation plan, including the following:

a. The responsible party for ensuring the LMP is implemented.

b. How the applicant will ensure that grounds crews have the training and/or resources required to implement the LMP and make adjustments based on advances in landscape care practices and products.

c. A fertilizer and pesticide application log, including rate of application, area treated, and disposal or storage of residue.

# I-2. Integrated Pest Management Plans

An Integrated Pest Management (IPM) Plan is a natural, long-term, ecologically based systems approach to controlling pest populations. This system uses techniques either to reduce pest populations or maintain them at levels below those causing economic injury, or to so manipulate the populations that they are prevented from causing injury.

The goals of IPM are to encourage optimal selective pesticide use (away from prophylactic, broad spectrum use), and to maximize natural controls to minimize the environmental side effects by creating and maintaining healthy landscapes:

- **Design for a healthy landscape**. A landscape should be designed to maximize intended uses of the land and to minimize potential pest problems. Design considers such plant health factors as site usage, soils, topography, hydrology and drainage, proximity to sensitive or critical areas and existing vegetation as well as known pest sensitivity. Take drainage pathways into consideration when considering landscape management and the potential need for pest control.
- **Awareness of potential pest problems**. Certain plants have known pest problems. Likewise, certain cultural conditions or landscape situations can encourage the infestation of pests.
- **Maintenance for maximum landscape health**. A well-designed and maintained landscape dramatically reduces the need for pest control. Appropriate selection of plants, pruning, proper irrigation, applications of mulch and fertilizer, appropriate mowing techniques, and other practices all promote landscapes that resist pest pressures and support natural predators.
- **Minimize disturbance of naturally occurring biological controls**. Pests have natural predator and control operating on them at all times. Disruption of these systems through poor maintenance practices can cause more of new pest problems to develop.

The step-by-step comprehensive ~~Integrated Pest Management (~~IPM~~)~~ Plan process is provided below as a guide.

## *The Integrated Pest Management Plan Process*

### *Step One: Correctly identify the~~problem~~ pest~~s~~ and understand its~~their~~ life cycle~~.~~*

Identify the pest (e.g., weed, insect, disease, etc.). Learn more about the pest. Observe it and pay attention to any damage that may be occurring. Learn about the life cycle. Many pests are only a problem during certain seasons~~,~~ or can only be treated effectively in certain phases of the life cycle. Repeat this step if more than one pest is identified.

### *Step Two: Establish tolerance/action thresholds ~~for pests.~~*

Every landscape has a population of some pest insects, weeds, and diseases. This is good because it supports a population of beneficial species that keep pest numbers in check. Beneficial organisms may compete with, eat, or parasitize disease or pest organisms. Decide on the level of infestation that must be exceeded before treatment needs to be considered. Pest populations under this threshold should be monitored but do not~~don't~~ need treatment.

For instance, European crane flies usually don't do serious damage to a lawn unless there are between 25 and 40 larvae per square foot feeding on the turf in February (in normal weather years). Also, most people consider a lawn healthy and well maintained even with up to 20 percent weed cover, so treatment, other than continuing good maintenance practices, is generally unnecessary.

### *Step Three: Monitor regularly to detect ~~and prevent~~ pest problems~~.~~*

Regular monitoring is a key practice to anticipate and prevent major pest outbreaks. It begins with a visual evaluation of the lawn or landscape's condition. Take a few minutes before mowing to walk around and look for problems. Keep a notebook, record when and where a problem occurs, then monitor for it at about the same time in future years. Specific monitoring techniques can be used in the appropriate season for some potential problem pests, such as European crane fly.

### *Step Four: Modify ~~the~~ maintenance program to promote plant healthy ~~plants~~ and discourage pests~~.~~*

A healthy landscape is resistant to most pest problems. Lawn aeration and overseeding along with proper mowing height, fertilization, and irrigation will help the grass out-compete weeds. Correcting drainage problems and letting soil dry out between watering in the summer may reduce the number of crane-fly larvae that survive. Gradually replace pest-prone plants.

### *Step Five: If pests exceed the tolerance thresholds, use cultural, physical, mechanical, or biological controls first.*

If~~Use~~ cultural, physical, mechanical, or biological controls ~~first. If those~~ prove insufficient, use the chemical controls described below that have the least non-target impact. When a pest outbreak strikes (or monitoring shows one is imminent), implement IPM then consider control options that are the least toxic, or have the least non-target impact. Here are two examples of an IPM approach:

1. **Red thread disease** is most likely under low nitrogen fertility conditions and most severe during slow growth conditions. Mow and bag the clippings to remove diseased blades. Fertilize lightly to help the grass recover, then begin grasscycling and change to fall fertilization with a slow-release or natural-organic fertilizer to provide an even supply of nutrients. Chemical fungicides are not recommended because red thread cannot kill the lawn.
2. **Crane fly damage** is most prevalent on lawns that stay wet in the winter and are irrigated in the summer. Correct the winter drainage and/or allow the soil to dry between irrigation cycles; larvae are susceptible to drying out so these changes can reduce their numbers. It may also be possible to reduce crane fly larvae numbers by using a power de-thatcher on a cool, cloudy day when feeding is occurring close to the surface. Studies are being conducted using beneficial nematodes that parasitize the crane fly larvae; this type of treatment may eventually be a reasonable alternative.

Only after trying suitable non-chemical control methods~~,~~ or determining that the pest outbreak is causing too much serious damage, should chemical controls be considered. Study

to determine what products are available and choose a product that is the least toxic and has the least non-target impact.

### *Step Six: Evaluate and record ~~the~~ effectiveness of ~~the~~ control, and modify maintenance ~~practices~~ or plant choices to support ~~lawn or landscape~~ recovery and prevent recurrence.*

Keep records. Note when, where, and what symptoms occurred, or when monitoring revealed a potential pest problem. Note what controls were applied and when, and the effectiveness of the control. Monitor next year for the same problems. Review your landscape maintenance and cultural practices to see if they can be modified to prevent or reduce the problem.

A comprehensive IPM Program should also include the proper use of pesticides as a last resort, and vegetation/fertilizer management to eliminate or minimize the contamination of stormwater.

# I-3 References

Refer to the Seattle Public Utilities Integrated Pest Management web page for additional resources for developing a LMP or IPM Plan: www.seattle.gov/utilities/protecting-our-environment/sustainability-tips/landscaping/for-professionals/integrated-pest-management