

City of Denton

Integrated Pest Management Standard Operating Procedures



Contents

Licensing and Training.....	3
STRATEGY 1: Licensing, Certification, and Continuing Education of Pest Management Personnel ...	3
Pest Management Procedures.....	5
STRATEGY 2: Management Methods for Pest Problems	5
STRATEGY 3: Pesticides Approved for Use by City of Denton Personnel	6
STRATEGY 4: Notification of Pesticide Use at a Site	7
STRATEGY 5: Pesticide Application on City Property and Street Rights-of-Way	8
STRATEGY 6: Pesticide Application Recordkeeping	10
Pesticide Material Management.....	11
STRATEGY 7: Use of Remaining Pesticide Solutions and Rinses	11
STRATEGY 8: Storage and Transportation of Pesticides	13
STRATEGY 9: Disposal of Empty Pesticide Containers and Unusable Pesticides	14
Safety Measures and Emergency Response	16
STRATEGY 10: Use of Protective Clothing and Equipment	16
STRATEGY 11: Emergency Information Concerning Accidental Pesticide Exposure	17
STRATEGY 12: Pesticide Spill Response	19
Targeted Pest Management	26
STRATEGY 13: Turf Broadleaf Weed Management.....	26
STRATEGY 14: Pesticide Applications around Community Gardens.....	29
STRATEGY 15: Waterways Pest Management	30
STRATEGY 16: Vegetation Management in Engineered Wood Fiber Playground Areas	33
STRATEGY 17: Venomous Insect Management	35
STRATEGY 18: Dog Area Pest Management.....	38
STRATEGY 19: Insecticide Use and Pollinator Protection	40
APPENDICES	42
APPENDIX 1: Approved Pesticide List for City Property and Parks Use	42
APPENDIX 2: Athletic Field Services Approved List.....	58
APPENDIX 3: City Urban Forestry Approved List.....	72
APPENDIX 4: Natural Areas Approved List.....	79
APPENDIX 5: Maintenance Schedule and Pest Management Methods	82
APPENDIX 6: Pesticide Spill Incident Report.....	93
APPENDIX 7: Product Label and Safety Data Sheet	94

APPENDIX 8: Emergency and Information Phone List 96
APPENDIX 9: Glossary 97
APPENDIX 10: Revisions..... 103

Licensing and Training

STRATEGY 1: Licensing, Certification, and Continuing Education of Pest Management Personnel

PURPOSE

This Strategy defines the education, training, licensing, and certification requirements for applicators who are applying pesticides, or supervising others applying pesticides.

BACKGROUND

State pesticide applicator licensing assures a level of expertise and familiarity with pest management practices and pesticide materials. The City is committed to maintaining a high level of expertise in our workforce and chooses to exceed the minimum standards. The continuing education requirements of state licensing also help to keep personnel up-to-date on pest management theory and practice. All personnel applying pesticides as their primary duty on City property is required to maintain a Texas Department of Agriculture applicators license. The Texas Department of Agriculture does allow non-licensed staff to apply pesticides under the supervision of a licensed applicator and/or the application is not a restricted-use and state limited-use pesticide and regulated herbicide under label directions when it is incidental to their primary duties.

STRATEGY

All COD personnel applying pesticides or herbicides as their primary duty shall be certified as state pesticide applicators by passing the Texas Department of Agriculture examinations. Applicators are required to recertify every year by obtaining five continuing education credits; with one credit each from two of the following categories: laws and regulations, integrated pest management or drift minimization. To maximize the value and relevance of the recertification training, the City will actively seek out educational opportunities for staff.

The ultimate responsibility for maintaining a valid applicator license is with the applicator. Pesticide applicators will be kept informed of approved supplemental education to meet continuing certification and licensing requirements. Unless special arrangements and approvals have been made, all applicators must be full-time employees. Regardless of licensing status, no seasonally employed staff members shall apply pesticides on park land, unless approved by a Park Manager, following a request from the supervisor of the seasonal employee.

Any personnel who do not apply pesticides as their primary duty, and are not licensed applicators, can apply pesticides as per Texas Department of Agriculture for incidental use. Incidental Use is defined as "A pesticide application on an occasional, isolated, site-specific basis that is incidental to the primary duties of an employee and involves the use of general use pesticides after instruction as provided by rules adopted by the Structural Pest Control Service." This means that if during the course of their normal duties, i.e. mowing, daily service or maintenance, and they find an infestation of fire ants or wasps, they are allowed by law to apply pesticides to protect visitors or employees. The application of the chemicals must be in accordance with the manufacturer's label.

In all cases of incidental use, the employee should use the least hazardous, effective method of controlling pests. **If chemicals are to be utilized, they must be applied in strict accordance with manufacturer labels of "General Use" products being used.** Applications made inconsistent with the

label requirements of the general use product may result in penalties being assessed against the individual and/or the certified noncommercial applicator or technician responsible.

Recertification Requirements

Licensed commercial, noncommercial and NCPS applicators are required to recertify every year by obtaining five continuing education credits; with one credit each from two of the following categories: laws and regulations, integrated pest management or drift minimization.

Change of Information

The Texas Administrative Code (rule 7.20) requires all licensees to notify the department within 30 days of any change in the information provided as part of the application for a license. Licensees must submit a change of information form that is signed. You can scan the signed form and email it to license.inquiry@TexasAgriculture.gov, faxed to 800-909-8534 or mail it to Texas Department of Agriculture, Licensing Division, P.O. Box 12847, Austin, TX 78711. This will ensure you receive licensing information from TDA.

Recordkeeping

Commercial, noncommercial and NCPS applicators shall maintain records of all pesticide applications as required by all applicable local, state, and federal laws.

Pest Management Procedures

STRATEGY 2: Management Methods for Pest Problems

PURPOSE

This Strategy establishes the principles governing the City's approach to pest management for all its lands.

BACKGROUND

COD utilizes the principles of Integrated Pest Management in managing land under its care. IPM is a coordinated decision-making process that uses the most appropriate management strategy on a site-specific basis. The IPM process first determines if a pest needs to be managed, and if so, how best to do it. Key elements of an IPM program are information gathering, well-informed decision making and monitoring of results. Through proper decision making, the IPM process promotes effective, low-risk management strategies to manage pests.

The management techniques used in an IPM plan include biological, cultural, physical, and chemical. Often a combination of methods is used. The following terms are used as defined:

Threshold is used to describe a level of pest presence above which unacceptable amounts of negative plant health impacts, negative environmental impacts, negative effects on infrastructure and assets, intolerable aesthetic impacts, or undue safety risks are likely to occur.

Action level is the point at which control measures are necessary to prevent a pest population or its impact from exceeding the threshold.

STRATEGY

COD shall employ integrated pest management principles in managing pest problems. Managers, Supervisors, Landscape Technicians, and other licensed applicators shall monitor plant health status, landscape conditions, and the presence of unwanted vegetation. They will assess appropriate thresholds and determine action levels on a site-by-site basis. All licensed applicators shall use approved management strategies to determine an effective, feasible, and economically sound pest management method that does not create undue risk to the public or the environment.

If a pesticide is chosen as the best method for pest management, licensed applicators shall choose appropriate materials only from the list of Approved Pesticides specific to their work unit found in Appendices 1-4. The suitability of the material, nature of the site, potential health and safety effects, potential environmental effects, overall costs, characteristics of the product and any other special considerations related to the situation shall be taken into account in this process. After control measures have been made, the site should be monitored to assess any impact and the efficacy of the measures taken.

STRATEGY 3: Pesticides Approved for Use by City of Denton Personnel

PURPOSE

This Strategy establishes oversight procedures over all pesticide materials available for use on City property. It defines the process of selection of pesticides that are approved for use on City property.

BACKGROUND

Pesticides vary widely in their characteristics and not every legally registered pesticide may be appropriate for use on city land. Pesticides must be carefully evaluated for their suitability for IPM use before they are included on a work unit approved list. Only properly evaluated pesticides are placed on approved lists specific to individual work units.

Parks and Recreation experience and IPM principles show that it is more desirable to have a specialized selection of products that target specific pests, rather than a smaller number of general-purpose pesticides. This aids in limiting the effects of the control to the target pest only. It aids in reducing the number of resistant pests that may arise from continued use of a small number of controls. It also leads to an overall reduction of pesticide usage required.

STRATEGY

The PARD Director and Superintendent shall maintain a list of pesticides approved for use by City personnel on City property. Once approved, the list “Criteria for Choosing a Pest Management Method,” shall be used in choosing the proper pesticide for a given purpose. Pesticides shall be chosen after assessing toxicological impacts, environmental impacts, efficacy, feasibility, cost, and all other pertinent aspects of their use within an IPM approach. The PARD Director and Superintendent shall be available for consultation in choosing a pesticide that best meets a defined need.

Only pesticides from the approved lists shall be chosen, unless approved otherwise from the PARD Director and Superintendent. The lists shall be reviewed on an ongoing basis so that they are as up-to-date as possible. Any pesticides that are proposed for addition or deletion from the list shall be approved by the PARD Director and Superintendent. The PARD Director and Superintendent will remain current with EPA registration and review activities. A pesticide deleted from the general approved list but placed on the “Use Up Do Not Restock List” is approved for use within specified units until current supplies are exhausted unless otherwise noted. All federal and state pesticide laws shall be adhered to. Deletion of a pesticide due to loss of federal or state registration will be upheld as per the schedule set by law. **Use of unauthorized pesticides or use of pesticides for unapproved or illegal applications will be cause for disciplinary action. Strategy adheres strictly to all label requirements concerning safe, legal and effective use of pesticides.**

Applicators must ensure that any pesticides utilized conform to the appropriate approved list. Special consideration is to be taken when implementing pest management methodologies in areas designated as environmentally sensitive areas (ESA).

STRATEGY 4: Notification of Pesticide Use at a Site

PURPOSE

This Strategy establishes procedures for notification of applications for all pesticide materials being applied by personnel.

BACKGROUND

COD understands that citizens may want to be informed of pesticide applications. Label requirements for pesticide applications may also mandate that entry to treated areas be avoided for a specific interval. Citizens may also wish to find out further information about pest management activities occurring at a public site. To satisfy these needs, **all pesticide applications in areas open to the public or accessible to the public for use will be accompanied by notification signage and/or site identification method** so that citizens are made aware of the treatment.

STRATEGY

It is the Strategy of the City of Denton to notify citizens of pesticide application sites using various methods of notification. The primary method is the placement of on-site signs. **These signs are posted at the time of application and placed in clearly visible locations, at conspicuous entries and/or application sites. Signs will remain posted for a minimum of 48 hours after the application.** The intent of the placement of the signs is that visitors will encounter them before they have had an opportunity to enter the treated area. The ONLY exception to the sign postage is for spot spraying applications made with a backpack sprayer, hand-held pressurized sprayer, or granular insecticide targeting an immediate threat (i.e. fire ants). Due to the nature of spot spraying, it may not be feasible to post signage at every location such as along sidewalks for cracks and crevices spraying or single mound/nest treatment for insects. Signage will be used notifying park visitors of spot spraying in the area when it is performed in active, populated areas open to the public.

Blue dye will be added to all spot spray application, so visitors can easily identify the areas that have been sprayed. Dye will not be used for broadcast applications. If an entire lot or tract has been sprayed, it will be noted on the posting signs.

PARD will utilize other methods of notification such as electronic postings and public notices placed in public buildings and recreational centers. Notices of broadcast spraying will be posted on the PARD's website and/or other applicable communication platforms. The notice will include the location and date of the spraying and the product that was used. A staff contact will be listed to provide additional information upon request.

STRATEGY 5: Pesticide Application on City Property and Street Rights-of-Way

PURPOSE

This Strategy establishes procedures for applications for all pesticide materials being applied by COD personnel.

BACKGROUND

It is the Strategy of the City of Denton for their employees to apply pesticides in a legal manner and to adhere strictly to all precautionary requirements for their use. This Strategy outlines procedures for pesticide application on public lands and street rights-of-way that are maintained by COD employees. All EPA registered pesticides are accompanied by a legal label specific to each product that defines all legal uses. Pesticides must be used according to these label directions.

STRATEGY

The pesticide must be used only on sites and targets specified in the label. Higher dosages, higher concentrations, or more frequent applications than the label allows for are not permitted and is against federal law. Directions for use, safety, mixing, diluting, storage, and disposal, as well as any restrictions on re-entry must be met.

The following criteria shall be met when applying pesticides. Some of these are addressed more specifically in other policies.

- The label is the law.
- Personal Protective Equipment (PPE) shall be used wherever indicated and it must be maintained in a workable and safe condition.
- Spray equipment shall be maintained in a safe and operational condition. Where applicable, spray equipment shall be calibrated regularly.
- Anti-siphoning devices shall be used when filling large spray tanks.
- “Criteria for Choosing a Pest Management Method” will be used in making choices.
- Pesticides used shall be chosen from the approved lists as provided for the appropriate work units.
- Pesticides shall be applied only when appropriate weather conditions exist.
- Notification signs shall be posted in areas where pesticides are being applied.
- All applications shall be recorded on approved application record forms.

Process for Utilizing Pesticides on City Property or Street Rights-of-Way

- i. A COD employee identifies or is informed of a pest problem.
- ii. Thresholds and action levels are determined by a licensed applicator or supervisor for the specific pest problem in question.
- iii. Management strategies are determined by a licensed applicator. Special situations may require expertise from outside the City such as university diagnostic laboratories.

If pesticides are to be used:

1. Choose the pesticide using the “Criteria for Choosing a Pest Management Method,” and “Approved List of Pesticides” for the appropriate work unit.
2. Check application equipment for safety and mechanical problems, and ALWAYS calibrate before each use.

3. Check weather conditions. Applications should be done when appropriate wind conditions exist to minimize drift and volatilization. Adjustments should be made for spray droplet size and pressure if conditions warrant. No application should take place where there is unacceptable drift.
4. Post notifications as required except for spot spraying or mound treatment of ants, to inform the public of the application. For specific rules, see the Notification Strategy.
5. List re-entry specifications on the signs if required by the label.
6. Apply material according to the label and in accordance with state and federal regulations.
7. Record applications of pesticides on the approved forms.
8. Remove signs after the label designated re-entry requirements have been met or after 48 hours has passed since the application. This is usually when the liquid pesticide has dried, unless indicated otherwise on the label.
9. Evaluate the results of management measures.

STRATEGY 6: Pesticide Application Recordkeeping

PURPOSE

This Strategy establishes recording and reporting procedures for all pesticide applications taking place on City property by COD personnel, or any other agency, department, company, or individual whether they are acting as a contractor or acting in a voluntary (approved) manner.

BACKGROUND

Detailed recordkeeping is an essential part of IPM implementation, and is vital in communicating, reporting, and analysis of pest management activities. State law requires that written records be kept for pesticide applications. The law requires that licensed applicators record the details of pesticide applications and keep these records for two years. These records must be stored in a central location and be available for review.

STRATEGY

It is the Strategy of the City to record and retain records of all pesticide applications performed on City land. Each application event will require an application form to be completed. The PARD Superintendent should review these on a periodic basis. A master file of these records shall be kept at a central location, such as the office where the licensed applicators work out of and maintained by their supervisor. Each operating unit shall keep a record file related to pesticide applications by their own personnel.

Information regarding application of pesticides to city property by state certified applicators who work for a bonded company and who have been contracted for application shall also be recorded including all information fields required by the TDA. Copies of these records must be provided to the PARD Superintendent upon request.

The following information must be included on the recording forms for each pesticide application by a COD employee: Date of application, application start time, location of site treated, name of applicator, state license number, temperature, wind conditions, equipment used, target pest, total area treated if applicable, names and EPA numbers of all products applied, mix ratio / rate of product per unit, total volume of material applied, coverage rate where applicable, and aquatic buffer designation where applicable.

At the end of each calendar year, all pesticide records will be submitted to the PARD Superintendent for pesticide reporting. These will then be collated onto a single form and submitted no later than March to the Watershed Protection Coordinator.

Equally important is the recordkeeping of non-chemical interventions. While not legally required, non-chemical interventions are the basis for evaluation, management, and action thresholds of IPM. Data collection and recordkeeping of non-chemical interventions is essential in demonstrating compliance with IPM principles and the effectiveness of actions taken. Staff will document non-chemical interventions in the appropriate record management system for analysis and reporting.

Pesticide Material Management

STRATEGY 7: Use of Remaining Pesticide Solutions and Rinses

PURPOSE

This Strategy establishes procedures for the use and disposal of any pesticide remains generated by COD applicators. It outlines methods for use of remaining pesticide solutions and rinses in a legal and safe manner.

BACKGROUND

Applicable laws require that all pesticide solutions and rinses be applied to target areas according to label directions. These solutions and rinses may also be disposed of at an authorized pesticide disposal site. It is the goal of COD to conduct our pesticide operations so that disposal of remaining material is not necessary.

STRATEGY

Pesticide solutions and rinses should be applied according to the label directions, and to legal target sites so there are no pesticides remaining. This shall be accomplished by accurately gauging the amount of pesticide needed for the job. COD promotes the use of advance planning to minimize the number of times it is necessary to switch pesticides in spray equipment. In order to reduce the amount of excess rinsate, it is the Strategy to rinse equipment only at the end of the spray cycle or when changing to pesticides that are incompatible with those in the tank. It is a legal requirement to fully label all tanks and sprayers containing leftover pesticides at the end of each day.

PROCEDURES

Following are some considerations to make before beginning an application to assure the proper amount of pesticide is mixed. Advance considerations:

- Weather conditions and predictions.
- Acreage/square footage of the job site.
- Calendar: special events, mowing, irrigation, etc.
- Type and size of the equipment appropriate to do the job.

When applying the pesticide use the following procedures to reduce and safely store the rinse solution. These are secondary to label information and State and Federal regulation.

- Mix only enough pesticide solution to do the job that day.
- Use up all pesticide, applying until the tank is empty, or no more solution is coming through the nozzle.
- If pesticide mix remains, completely label the tank or sprayer with legal labels for the products used. Also mark the current concentration for each product, the date, and the name of the applicator.
- When resuming spray applications, the next time, either use the leftover material, or add dilution water and circulate the mix thoroughly before adding new concentrate.
- If spray tank rinsate is created, store the rinsate as make-up water for the next day. The next day's pesticide should be compatible or the same. The same labeling requirements pertain to the rinsate mix.

Rinse the sprayer if the following conditions apply:

- It is necessary to use a pesticide incompatible with that previously used.
- It is the end of a spraying cycle.

Use the following rinse process:

1. Read the pesticide label. The following should not conflict with label information or State or Federal regulations. Contact your supervisor if you see a conflict or have questions.
2. Wear protective clothing, as listed on the label when handling pesticides, pesticide containers, or pesticide equipment.
3. Fill the spray equipment approximately $\frac{1}{4}$ full with clean water. Shake or agitate so that all inside surfaces are washed. If possible, use the spray hose to rinse the inside surface of the tank. These procedures should coincide with all labels.
4. Spray the rinse water out of the spray equipment onto an approved target area. Rinse water should be run through all hoses, booms, etc. Filters should be cleaned. Because of the dilute nature of the pesticide in the rinse water, a coarse spray can be used and is recommended to save time. Do not “pond” or saturate the soil.
5. If the tank is to be stored, repeat step 3 and 4 above two times until the tank is clean.

Cleaning motorized, mechanical sprayers:

1. No pesticide solution shall be left in the tank or any other moving part overnight.
2. Equipment must be cleaned according to manufacturer’s recommendation and in accordance to label recommendations.
 - a. This ensures longevity of equipment and safety measures should the equipment need to be worked on.
 - b. This prevents an environmental hazard should the tank, hoses, or pump begin to leak.

STRATEGY 8: Storage and Transportation of Pesticides

PURPOSE

This Strategy defines the method and procedure for storage of pesticide materials for all COD locations and personnel.

BACKGROUND

Attention to the proper storage is vital to assure public and employee safety, as well as to protect the investment in their purchase. Several agencies are involved in regulating aspects of pesticide storage. No single agency has comprehensive authority. Agencies involved include State of Texas Department of Agriculture, Texas Commission on Environmental Quality, U. S. Environmental Protection Agency, Texas State Fire Marshall, and the Denton Fire Department. Pesticides will be stored and transported in a manner that reduces the risk of spills, exposure, theft, degradation, contamination, or loss.

STRATEGY

Pesticides or pesticide containers shall be kept in secure and safe locations in accordance with existing laws. They shall be kept in a secure location and, if possible, in a temperature controlled, well-ventilated area. Areas used for storage shall be labeled and designated for use by work unit supervisors. Pesticides shall be safeguarded from environmental damage such as extreme temperature, photodecomposition or moisture. All pesticides in storage shall be inspected regularly and, if necessary, rotated on the shelf to assure that the oldest dated items are used first.

Storage of pesticides shall be in accordance with applicable laws. Individual sites may store pesticides if they are in spill-proof and lockable cabinets and labelled as pesticides.

Pesticides being transported shall be appropriately and safely secured in the vehicle. Only licensed applicators shall transport pesticides. Appropriate spill response supplies, as outlined in Strategy 12, must be immediately available. Pesticides shall not be transported in passenger cabs of vehicles where alternatives exist, such as truck beds, truck boxes or vehicle trunks.

STRATEGY 9: Disposal of Empty Pesticide Containers and Unusable Pesticides

PURPOSE

This Strategy defines the method and procedures for the disposal of pesticide containers and unusable pesticides or those pesticides whose registrations have been totally or partially suspended.

BACKGROUND

COD considers proper disposal of unusable pesticides and pesticide containers of the utmost importance to the safety of employees, the public, and the environment. Several governmental agencies regulate pesticide disposal. No one agency has comprehensive authority. Agencies involved include the Texas State Department of Agriculture, Department of Environmental Quality, Environmental Protection Agency, and Occupational Safety and Health Administration. COD will comply with all relevant laws governing the proper disposal of these materials.

STRATEGY

COD shall dispose of pesticides and empty pesticide containers in accordance with all State and Federal regulations and label recommendations. Disposal of pesticide containers and unusable pesticides not in accordance with this Strategy will be cause for disciplinary action.

PROCEDURES

Read the pesticide label. The following steps should not conflict with label information or state and federal regulations. Contact your supervisor if you determine a conflict or have other questions. Always wear protective clothing when handling pesticides or pesticide containers, as directed on the label.

For non-rigid containers including bags, sacks, and boxes

1. Pesticide material must be emptied into application equipment to the extent made possible by physical agitation of the container.
2. Visually verify that residues have been removed.
3. Multiple-rinse non-rigid containers such as paper lined with plastic or foil.
4. Place in a plastic bag and mark as to contents.

For rigid containers such as plastic, glass, or metal

1. Pesticide material must be emptied into application equipment to the extent possible by pouring, then visually verifying that the residues have been removed.
2. The container must be rinsed with clean water until clean; the rinse water being poured into the spray equipment. Empty the pesticide and all rinsates into the sprayer before the full amount of diluting water is added to the spray equipment.
3. Place in a plastic bag and mark as to contents.

Storage of Containers

1. Containers must be stored in plastic bags in a secure area until they can be taken to a secure collection site. The Park Maintenance Complex is a designated secure collection site.
2. Containers must be transported to and placed in the designated secure container box at the Park Maintenance storage area. Each container product name and size must be recorded by a licensed applicator on the designated form at that time.

3. An inventory of products will be maintained by City staff. For each container, record the date, name of the pesticide, quantity and size of the container. These records shall be kept at the site, and copies forwarded to the PARD Superintendent and the City's Risk Manager as required.

Disposal of Unusable Pesticides

Unusable pesticides are ones that: 1) are damaged through vaporization, freezing, infiltration of moisture to containers or photo decomposition; 2) have exceeded their shelf life; or 3) have visually changed their composition or structure in some manner.

1. A Department Manager and/or Supervisor should be informed of plans to dispose of pesticides and of results of the disposition.
2. The Department Manager and/or Supervisor responsible for land management will contact the TDA, the manufacturer or dealer and/or a licensed consultant and find out if the product is still usable.
3. If the pesticide has less activity due to long storage, moisture, or freeze damage, follow the recommendations of the dealer, manufacturer, or licensed consultant and use procedures in this Strategy as they apply. One option could be to apply the material realizing that full control is not achievable using the damaged pesticide.
4. If this option cannot be followed legally, follow recommendations of the dealer or manufacturer or licensed consultant. It is not legal to transfer damaged or altered pesticides to another party for use. It may be necessary to arrange for disposal of the pesticide in a manner recommended by TCEQ.
5. The Pesticide Licensed Applicators are responsible for properly disposing of pesticides according to law and TDA. A record of these disposals should be kept on file for three years.

Disposal of Pesticides with Totally or Partially Canceled Registrations (or those which have been removed from approved use)

1. The Department Manager and/or Supervisor responsible for land management shall keep up-to-date on the pesticide regulatory news and respond to pending actions appropriately to minimize or eliminate stocks of unusable pesticides.
2. If unusable pesticides remain in stock, staff will follow recommendations of the regulatory agencies, manufacturer or dealer in finding a legal user for the pesticide. If the pesticide is unopened and/or still retains its integrity it may be possible to transfer the pesticide to a legally registered bureau, agency, or group to use.
3. It may be necessary to dispose of the pesticide in a manner recommended by TDA and TCEQ.

Safety Measures and Emergency Response

STRATEGY 10: Use of Protective Clothing and Equipment

PURPOSE

This Strategy outlines the requirements for the use of protective clothing and equipment by COD personnel when undertaking pest management activities.

BACKGROUND

Use of pest management tools, equipment, and materials may require the use of personal protective equipment (PPE). Use of such equipment is necessary to provide an adequate measure of safety for the applicator. This protective equipment will be clearly defined in the legal pesticide label directions or directives in equipment manuals. When such directives exist, they must be adhered to. Use of appropriate protective equipment may not be so clearly defined for all pest management methods, and in such cases, it is the responsibility of the applicator to determine and employ adequate safety equipment.

STRATEGY

Personnel engaged in the use of pest management tools, equipment, or materials shall follow all clothing and equipment requirements required to ensure their safety. When using pesticides, the label directives for use of PPE must be adhered to. Use of related power and mechanical equipment must be accompanied by appropriate PPE as determined by equipment manuals or supervisor's directives.

Minimum PPE standards are:

- Long sleeve shirt
- Long pants
- Closed-toe shoes with socks.

Required personal protective equipment appropriate to satisfy specific pesticide label requirements shall be provided by COD to employees for their use. This may include, but is not limited to: respiratory protection, eye protection, coveralls, rain gear, mixing aprons, chemically resistant boots, gloves, head protection, and hearing protection. Time will be made available to wash up before lunch and at the end of the work shift. The applicator is responsible for cleaning, storing, and maintaining PPE and equipment in a safe and useful manner. Applicators may also provide their own additional PPE if desired, if such equipment and its use has been previously approved by their supervisor.

If applicators apply organophosphate and carbamate insecticides in amounts and frequencies determined by Natural Agricultural Safety Data base to require cholinesterase blood tests, PARD will provide for these tests. This testing monitors the potential depletion of the enzyme cholinesterase in the blood, an indicator of exposure to these materials.

STRATEGY 11: Emergency Information Concerning Accidental Pesticide Exposure

PURPOSE

This Strategy establishes procedures for the proper response to employee and citizen inquiries regarding accidental exposure to any pesticide material used by COD staff. It defines the City's response to inquiries concerning adverse health effects as a possible result of accidental exposure to pesticides.

BACKGROUND

The City's handling of public inquiries should be prompt, professional, and well-supported. While staff can answer general questions, the City does not have medical professionals on staff to address specific medical questions relevant to accidental exposure. This expertise is readily available in the health care community. Therefore, concerns of this nature will be referred to qualified medical personnel for resolution.

STRATEGY

COD will inform applicators of proper procedures to be taken in case of pesticide exposure. Anyone inquiring about pesticide exposure will be referred to his or her own personal physician, the Central Texas Poison Center (CTPC), or the Texas Department of State Health Services (DSHS). A list of these authorities and their phone numbers are listed in the appendices.

Safety Data Sheet (SDS) information about all hazardous substances in the workplace is available to all personnel. This information includes symptoms of exposure, and procedures for handling overexposure to individual pesticides. If symptoms of illness occur during or shortly after applying pesticides, the CTPC should be contacted or the individual should receive medical attention immediately.

Non-emergency questions received shall be referred to the appropriate COD staff member who will provide information to the questioner or refer them to qualified individuals or sources for further information.

PROCEDURES

- Use planning to avoid emergencies and to expedite aid should an accident occur.
- Be informed of the symptoms of exposure and the decontamination steps necessary in case of accidental exposure.
- Use all safety procedures and protective gear as recommended on the label.
- Have a copy of the appropriate label available when applying or transporting pesticides (concentrated and dilute.)

In case of a medical emergency related to suspected pesticide exposure:

- Handle any emergency situation as per First Aid instructions, or label and SDS.
- Call for emergency backup if necessary.
- Refer to Central Texas Poison Center.
- Take a label for reference for medical personnel if it is necessary to leave the site.
- Inform your supervisor as soon as possible.
- Inform the immediate supervisor or department manager as soon as possible.

In response to a non-emergency inquiry:

- Respond to questions to the best of your ability.
- Refer detailed or technical questions to the appropriate COD staff member.
- Inform your supervisor.

STRATEGY 12: Pesticide Spill Response

PURPOSE

This Strategy outlines the objectives, training requirements and procedures COD personnel should follow in response to an accidental release of pesticides. This applies to all COD staff involved in applications of pesticides, handling of pesticides, or acting in a communications response role during a spill incident.

BACKGROUND

Several state and federal regulations apply to an unintentional release of pesticides. Several state and federal regulations apply to an accidental release of hazardous materials. The Department of Transportation (DOT) and the Public Utilities Commission (PUC) regulate the transport of hazardous waste resulting from a spill and the release of chemicals if it occurs when they are being transported. The Environmental Protection Agency (EPA) and the Texas Commission of Environmental Quality (TCEQ) protect the environment through regulation concerning prevention of and response to the contamination of water, land, and air resulting from a pesticide spill. They are also tasked with the responsibility to make sure that the pesticides are properly disposed of. These regulations are incorporated into the procedures outlined here. Through its Pesticide Spill Response Strategy, the City strives to take a leadership role as a steward of public land and of the environment.

STRATEGY

The primary method by which COD reduces pesticide spills is through prevention. Through planning, preparation, adherence to good work practices, and increased awareness of the potential results of a spill, the possibility of a spill occurring is minimized.

City personnel will respond in accordance with all governmental regulations, including those of DOT, EPA, TCEQ, OSHA, and this Strategy should an accidental release of a pesticide occur. In performing emergency activities following a spill, protection of both employees and the public, is of great concern, as is protection of property and the environment.

Anyone liable for a spill shall immediately clean up the spill or release. The cleanup must use the best available methods to achieve the lowest practicable level of contamination.

OSHA, which is concerned with worker protection, has two regulations governing spills. The first one, *Hazard Communication*, applies to incidental spills that present a low potential of hazard to the worker, the public and the environment. Included are small spills of dilute pesticides, spills of material with granular formulations, and lower toxicity materials. The other regulation, *Emergency Response*, applies to incidents with a high degree of hazard such as large spills of dilute material, pesticides with higher toxicity, and concentrates in a confined space.

An incidental spill becomes an Emergency Response when:

1. The release or spill significantly impacts another agency's functions;
2. The incidental spill precipitates evacuation or curtailment of work;
3. The event causes a negative impact on neighboring facilities or the community; or
4. The spill involves a coordinated effort by local first responders.

Only licensed pesticide applicators can transport or apply pesticides. They will receive training and equipment that will allow them to respond to incidental spills. Spills that require an Emergency Response will be handled by a local HAZMAT team.

An assessment and evaluation of the quantity, hazardous level, and impact of each spill will be conducted. Spills will be reported as required by local, state, and federal regulatory agencies. Staff will coordinate response and reporting activities with the local HAZMAT team, the Emergency Management Coordinator, and the Director of Environmental Services.

The spill need not be reported immediately if it occurs on a surface impervious to the hazardous material and is fully contained, and if it is completely cleaned up without further incident, including repairing the cause of the spill. The immediate supervisor or department manager will determine whether these agencies should be contacted.

Particular attention should be paid to ensure that a pesticide does not pollute the water supply. A primary aim in following the procedures outlined here is to recover and reuse as much of the spilled pesticide as possible. Any absorbent or other contaminated material from which the spilled pesticide cannot be recovered is hazardous waste and must be labeled, stored and disposed of properly.

RESPONSIBILITY AND TRAINING

Three levels of spill response have been identified. The levels and their training requirements are described below:

Level Description and Training

Level I is for individuals who come into indirect contact with pesticides and their use. They must be able to recognize and respond to an emergency by obtaining and passing on information, and by making the appropriate notifications. They will not take an active role in containment and clean up procedures.

People at this level will have sufficient training to acquire competency in the following areas:

1. Familiarity with CHEMTREC⁶ (provides access to technical experts on chemical products and hazardous materials and maintains a large database of Material Safety Data Sheets. CHEMTREC can be reached at (800) 424-9300) and an understanding of their own role in an emergency.
2. An understanding of pesticides as hazardous substances, and the risks associated with them in a spill.
3. The ability to recognize the presence of hazardous material in an emergency.
4. The ability to recognize the need for additional resources, and to make appropriate notifications.

People in this category include those managers supervising land maintenance and management operations. These individuals will receive additional training to familiarize them with their role in the case of an emergency.

Level II is for licensed applicators that apply or transport small volumes of low to moderately toxic pesticides. This level includes response to incidental spills. Individuals at this level are trained to prevent spills from occurring. Should one occur, they are trained to stop the release, keep it from spreading, and do cleanup. Most licensed pesticide applicators are in this category.

Individuals at this level will receive training in addition to pesticide applicators, along with hazard communication and respiratory protection training. They must exhibit competency in the following areas as well as those listed in the base level.

1. Familiarity with activities which promote spill prevention.
2. Familiarity with the Spill Response Program and their own role in an emergency.
3. Knowledge of safety and health hazards of hazardous materials in a spill.
4. An understanding of basic chemical and toxicological terminology and behavior.
5. Knowledge of work practices that employees can use to minimize risks from hazards.
6. Selection and use of proper personal protective equipment.
7. Identification of symptoms that may indicate overexposure to hazards.
8. Implementation of basic decontamination procedures.
9. Performance of basic control, containment, and clean-up techniques.
10. Skill in determining when a spill is fully cleaned up.

Level III training includes individuals who apply or transport over 50 gallons of dilute pesticides, or more than 1 gallon or 10 pounds of concentrate with a danger label. They are trained to stop the release, keep it from spreading and do cleanup.

1. Knowledge and use of spill prevention techniques for larger equipment.
2. Knowledge of hazard and risk assessment techniques.
3. An understanding of basic hazardous materials terms.
4. An understanding of basic chemical and toxicological terminology and behavior.
5. Selection and use of proper personal protective equipment appropriate for more toxic pesticides.
6. Implementation of decontamination procedures.
7. Performance of control, containment and clean up techniques.

This level includes the department managers and supervisor directly overseeing landscaping and ground maintenance and who will be coordinating with officials on notifying regulatory agencies, documenting incidents, ensuring that the cleanup is complete, and making arrangements for disposal of hazardous waste.

SPILL PREVENTION

COD personnel will employ a variety of practices to reduce the potential of a pesticide spill. These will include the following:

Purchasing

When procuring chemicals, a factor in determining which chemical formulation to purchase will be the ease with which it can be cleaned up in the event of a spill. Types of packaging and formulations that may help to prevent a spill from occurring will be factors as well. Characteristics of the pesticide, such as toxicity and reactivity that may affect the seriousness of a spill, will also be considered.

Preparation

Planning, training of personnel, and acquisition and maintenance of equipment and supplies will be done to reduce the risk of a spill occurring, and to minimize damage should one occur. For example, regular preventative maintenance will be done on sprayers, replacing hoses and valves before they wear out.

Work Practices

COD personnel will use practices to minimize the potential for a spill to occur, and to ease clean up should one occur. For example, pesticides should be placed in a leak-proof container while being transported.

PESTICIDE SPILL PROCEDURES

Pesticide spills can pose serious threats to human health and cause significant environmental contamination. A thorough knowledge of the appropriate steps to take in the event of a spill will allow you to minimize the potential for adverse effects and may save you a great deal of money in expensive cleanup costs. Always be prepared to handle spills before they occur. It is a good idea to have a spill kit in storage and mixing areas. Contamination can greatly increase when delaying response to a pesticide spill.

Spills may be relatively minor, involving one or a few leaking containers. However, major spills, such as when a sprayer overturns spilling its contents, can and do occasionally occur. Regardless of the magnitude of the spill, the objectives of a proper response are the same.

1. **ASSESS** the situation
2. **CONTROL** the spill.
3. **CONTAIN** the spill.
4. **CLEAN IT UP.**
5. **DOCUMENT** the spill.

(NOTE: Should a release of a pesticide occur, the following guidelines shall be used: Do not clean up the spill if you are not properly trained, if you don't have proper protective equipment or if doing so would endanger your health or safety.)

ASSESS THE SITUATION

1. **Out of Control Release:**
 - a. Tell bystanders to remain at a safe distance.
 - b. Call 911. Ask for fire; describe the situation as a hazardous materials spill. If there are injured people, ask for an ambulance. If chemical injury is involved, be certain that a copy of the label accompanies the victim.
 - c. Assist injured people. Remove contaminated clothing immediately.
 - d. Determine whether there is an imminently hazardous situation that you can take steps to correct. (For example, it may be appropriate to move the truck away from a waterway or heat source.)
 - e. Contact supervisor.
 - f. If the spill is on a roadway, set up DOT reflectors upwind of spilled materials and divert traffic if possible.
 - g. Remain on site and update the Denton HAZMAT Team as new information develops.

2. **Controllable Release** and there are no injuries:
 - a. Tell bystanders to remain at a safe distance and initiate control and clean up procedures outlined in CONTROL THE SPILL. You should be also putting on any PPE necessary.

3. Report the Spill

Notification will depend on the hazard level of the product spilled, the nature of the spill and state regulations. Part of preparation should be to know the cleanup procedure and reporting sequence for each product. A supervisor should be notified immediately. As a rule, the Emergency Management Coordinator, Risk Manager, and Watershed Protection Department should be notified for all reportable spills.

When you notify authorities of an emergency, have the following information:

- The name and phone number of the contact person at the facility where the spill occurred;
- The location of the spill and if water is threatened;
- The name of the chemical spilled;
- If the product is known to be acutely toxic;
- The estimated quantity spilled;
- The extent of injuries or exposure;
- The cause of the spill;
- Action taken to control and contain the spill;
- Planned cleanup procedures, evacuation and other precautions; and
- When the spill occurred.

CONTROL THE SPILL

When attempting to control the flow of the chemical, do not expose yourself unnecessarily. Always carry protective clothing, Personal Protective Equipment (PPE) and spill containment equipment when transporting pesticides. Use this equipment when pesticide emergencies occur.

1. Put on protective equipment.
2. Do not allow the material to enter a drain. Survey the area to see if there is a need to place a dam to protect a sewer drain or another waterway. If the pesticide does enter a drain, reduce the flow as much as possible, and call Watershed Protection at 940-349-7123 immediately. If not available 940-349-7000.
3. Stop the flow of the chemical.
 - If the spill is from a leaky container, position the container to prevent additional spillage.
 - If the spill is from a leaky valve, isolate the valve and depressurize the tank.
 - If the spill is from a broken hose shut off valve or pump it may help to loop the hose back into the tank.
 - If there is a rupture, use duct tape or any other material (such as rags or a patch) to stop the flow of a chemical.
4. Contain the spill using absorbent material. Call the Denton HAZMAT Team to request additional supplies, resources, and assistance if needed.
5. Change or add to your protective equipment as necessary. Put contaminated protective equipment in a plastic bag to transport to your work unit for cleaning. Follow proper decontamination procedures for protective equipment.

CONTAIN THE SPILL

After the leak has been controlled as well as possible, contain the spilled material in as small an area as possible. With liquid spills, construct a dam to prevent the chemical from spreading. It is particularly important not to allow any chemical to get into any body of water, including storm sewers. Do not hose down the area; this will cause further spread of the chemical. Liquid spills can be further contained by

spreading absorbent materials such as fine sand, vermiculite, sawdust, or clay over the entire spill. For absorbing small spills and minor leaks, kitty litter is particularly useful. (NOTE: Avoid the use of sawdust or sweeping compounds if the pesticide is a strong oxidizer. Such a combination presents a possible fire hazard.)

CLEAN UP THE SPILL

After the spill has been contained, consult with the Denton HAZMAT Team and Watershed Protection on clean up.

1. For dry material, sweep up the pesticide.
2. For a liquid spill, materials such as absorbent dikes, pillows, and towels can be used to absorb a product.
3. For concentrate spills on pavement, after picking up as much as possible, contain the area and wash the pavement with a small amount of water. Absorb this diluted pesticide and reclaim it.
4. If the soil has been contaminated, contact the Denton HAZMAT Team. The department manager, your supervisor, and you will determine to what degree cleanup should proceed using COD personnel. You may be asked to remove the contaminated soil. If so, scoop up enough soil to completely remove the pesticide. Place unusable material in a container labeled "Hazardous Waste". Coordinate the disposal of the material with the Denton HAZMAT Team and/or Risk Management.
5. Contact the Denton HAZMAT Team if it has not been done already. Have the Spill Incident Report ready so that your supervisor and the manager can evaluate the situation.

DOCUMENT THE SPILL

1. Complete a Pesticide Spill Incident Report.
2. A copy of the report will be filed with the department manager and supervisor directly overseeing landscape and ground maintenance operations.
3. All Pesticide Spill Incident Reports will be reviewed by the department manager and supervisor. A debriefing of the incident will be held with staff and additional training will be provided based on the nature of the incident.
4. Restock the Spill Kit

Pesticide Spill Kit Response Equipment

The following items must be immediately available to all persons applying or transporting pesticides:

1. Hard copies or mobile access to the following information:
 - Chemical labels for materials being transported;
 - SDS for chemicals being transported clipped to front of binder;
 - Pesticide Spill Response Procedures and Incident Report;
 - A DOT Emergency Response Guidebook; and
 - Emergency phone numbers
2. A radio, other two-way communication device, or cellular phone if there is the potential of a spill occurring that would require assistance.
3. Personal protective equipment appropriate for handling the pesticides being applied or transported in the event of a spill.
4. An eyewash either on the truck or on site and immediately available in the case of an emergency.
5. Tools and supplies to make repairs to the application equipment and to stop leaks.

6. A means of picking up spilled material. Depending on the formulation this may include absorbent material, broom and dustpan, or shovel.
7. Plastic recovery bags and ties for the material and for contaminated personal protective equipment.
8. A jug of water and detergent.

Targeted Pest Management

STRATEGY 13: Turf Broadleaf Weed Management

PURPOSE

This Strategy defines the management of weeds in the turf areas of City property and the use of selective turf herbicides by an applicator.

BACKGROUND

For turf to function in the manner it was intended, appropriate maintenance standards may require management of weeds within these sites. While the subject of overall turf health is a topic too complex to cover in detail within this Strategy, the management of weeds in designated turf sites shall be regulated by this Strategy. Designated turf sites generally include active park areas, athletic fields, and high traffic / high visibility locations such as City Hall. Other City property may be designated as needed or prioritized.

The establishment and maintenance of quality turf requires a proper site, good root zone conditions, optimum fertility levels, adequate irrigation, correct mowing practices, and other factors. COD relies primarily on attention to these sites and cultural factors in maintaining turf and minimizing the density of weeds. Adherence to good cultural practices aids in development of healthy stands of turf which resist establishment of weeds. Selective herbicides can also be used as effective tools to reduce or eliminate populations of weeds in turf as part of an overall program of turf health maintenance.

Examples of turf health practices currently employed include:

- Proper siting.
- Site and soil preparation.
- Drainage improvements.
- Pruning of adjacent plants for increased sunlight penetration.
- Proper selection of grass varieties.
- Core aeration.
- Overseeding.
- Mulch mowing to leave clippings on site.
- Mowing at the proper height and frequency.
- Proper irrigation practices.
- Proper fertilization.
- Application of selective broadleaf and grassy herbicides.

STRATEGY

Turf plays various important functions in our land management. When an area has been determined to be maintained as turf, it is the Strategy of PARD to do so primarily through the implementation of proper planning, cultural, and mechanical practices. These practices are generally adequate to keep the population of turf broadleaf weeds at acceptable levels. At certain sites these practices alone may not be adequate to keep broadleaf weeds at acceptable levels. An acceptable level of turf quality and tolerance of weed infestation varies with the site. The threshold at which controls may be necessary shall be determined on a case-by-case basis taking into consideration such factors as location, public expectation, the manner of activities taking place on the turf, the history of previous control attempts,

and stresses placed upon the site. The management effort must consider and employ all applicable cultural and mechanical methods as components of a plan to return the turf to an acceptable level of quality. Goals of these methods may include reducing soil compaction, improving soil structure, seeding, increasing drainage capacity, and encouraging healthy and vigorous turf growth through proper fertilization.

PROCEDURES

For proper IPM, it is essential that there be proper coordination between all the components of turf health management. To ensure this coordination, land maintenance and management supervisors will consult with staff stakeholders such as department representatives and program supervisors / coordinators to understand the use, expectation, and level service the area will require. All applicators will work with land maintenance and management supervisors to identify pest threats and determine the appropriate course of management.

Appendix 5 outlines the general maintenance schedule for turf management. Several factors can affect the adherence to the schedule including but not limited to the following:

Special Considerations

By its nature, the use of herbicides in turf requires their application to sites that have varied, and direct public uses, often involving children and pets. These applications must be carefully planned to allow for careful adherence to the pesticide label directives, and to minimize any potential impacts on these users.

Time of Day

Applications should be made during the best time of day to avoid public use, high temperatures, and wind. Applications can be made as early in the day as possible or after park hours. Applicators should consider off schedule timing, such as shifting work hours so that spraying can be completed before conditions and park use makes applications problematic. Minimizing public inconvenience and public concern should be of paramount importance.

Scheduling Conflicts

Any proposed applications should consider the expected use of the area for that date and time, such as nearby school activities, recreation activities, athletic field scheduling, park special events, and all other anticipated uses.

Signage

Notification signage is of utmost importance in turf applications. The nature of a typical turf site is open and with easy public access. As stated in the Integrated Pest Management Program *Notification of Pesticide Use at a Site* Strategy 4, signage should be adequate to inform any park user approaching the area.

Seasonal Timing

Wherever possible, applications should be timed to coincide with the ideal time for turf weed control. This is typically during the spring and fall months, where weed growth is active and conditions leading to turf stress, such as dry and hot weather, are not present. Integral to IPM is knowing specific weed life cycles in order to have effective control.

Drift

Drift is the movement of spray product from an area of application to any unintended site. Drift can occur in the form of droplets during application or as vapors after application. Minimizing drift is critical in turf weed applications. Use of boom sprayers instead of backpack sprayers may increase the potential for drift. Great care should be taken to minimize any possible drift. Caution must be taken at wind speeds of 10 MPH or more. Application is prohibited at wind speeds of 15 MPH or above. Read and follow the product label directions carefully for all products. Applications should cease if any drift inducing condition becomes apparent. Use of appropriate pressure, correct nozzles and other techniques should be employed to minimize creation of small spray particles that may drift.

Targeted applications

Where warranted spot spraying for turf weeds should be employed. While there are sites that will require an overall broadcast application, there are sites where only certain areas will require treatment. Applications should be focused on the target weed as much as practicable.

STRATEGY 14: Pesticide Applications around Community Gardens

PURPOSE

This Strategy defines acceptable and unacceptable use of pesticides within and near park areas designated as community gardens.

BACKGROUND

Pest management in or near park areas designated as community gardens necessitates special considerations. The Community Garden Program's participants have varying levels of knowledge about pest management methods and have differing views about the use of pest management materials. Community garden plots are near one another and may change ownership from year to year. Community gardens also produce edible crops which dictate special constraints in managing pests. For these reasons, a special Strategy was formulated and defines the acceptable use of pesticides within Community Gardens.

STRATEGY

- PARD staff will work in coordination with the Community Garden Committee to establish guidelines regarding garden plot use by participants of the program.
- PARD staff shall establish internal guidelines regarding pesticide use by participants of the program.
- PARD aims to dedicate 50% of the community garden plots for organic gardening. The use of non-organic pesticides, herbicides, or fertilizers is prohibited.
- The plots will be strategically located to protect the integrity of organic methods and practices.
- Park employees are asked to take all precautions necessary to keep applications, including any drift, of all pesticides at a minimum from the outside perimeter of Community Garden sites.
- Mechanical means, such as cutting, hoeing and mulching, are the preferred method to remove or control weeds in the Community Garden sites and perimeters.

STRATEGY 15: Waterways Pest Management

PURPOSE

This Strategy establishes procedures for use of any pesticide materials being applied by COD personnel adjacent to, or upon Denton's waterways.

BACKGROUND

This Strategy was written in conjunction with Watershed Protection division's personnel. The intent is to protect water quality in Denton's streams and reservoirs.

STRATEGY

It is the strategy of the City to use all measures to protect the city water supply from contamination through pesticides. COD employees will provide any information needed by the Watershed Protection division and will notify them prior to any spraying of pesticides within or near creeks, rivers, streams, lakes, or any waterways. Some of the regulations in the strategy deal with the following:

- Applications of pesticides will not be made if conditions resulting in drift are present.
- The Watershed Protection division will be notified if there is a spill or accident that causes unplanned release of pesticides into waterways or environmentally sensitive areas. Refer to Strategy 12 for the appropriate response actions.
- The applicator will contact the Watershed Protection division when known pesticide applications will be made in areas inside or near creeks, rivers, streams, lakes, or any waterways. The information should include the pesticides expected to be used, the locations of use, and the frequencies of application.

GENERAL GOALS AND PHILOSOPHY

COD recognizes the special importance of the rivers, streams, ponds, water quality facilities and wetlands that fall under our stewardship. The sensitive nature of such habitats, their plant and animal communities, and their direct link with other waterways require that we establish specific policies to ensure their health. The IPM outlines special procedures and clear guidelines and limitations regarding maintenance methods and materials for both these waterways and the public lands adjacent to them. An integrated approach will be used in all landscape management decision making

MANAGEMENT PRACTICES, MATERIALS AND LIMITATIONS FOR PARKS

WATERWAYS AND BUFFERS

Definitions

The *buffer zone* referred to in this Strategy is defined as a corridor of land between the top of the stream bank and the edge of the waterline at the time of application.

Application Equipment Used

Pesticide delivery for all listed areas in this Strategy will be carried out by hand with directed, low volume, single wand sprayers, wiping, daubing and painting equipment, injections systems, or drop spreaders. Typically, this is done by backpack sprayers, but may also include sprayers with larger fill tanks as long as the same kind of hand application methods is used. These methods of delivery result in low volume applications and low-pressure spraying. This minimizes the formation of fine mists that

might be carried off target. These practices ensure that applied materials will reach targeted plants or targeted soil surfaces.

Pesticide Drift

When applications of pesticides are being made within the buffer zone, great care will be exercised in the process. Managing drift is of particular importance when surface waters are nearby. Equipment used in the application shall employ all necessary methods to limit drift.

Nozzle size, pressure regulation, droplet size, and height of spray wand, are all techniques that can be modified to reduce unwanted drift of pesticides.

Spray applications will not be allowed in the buffer area when:

- Wind speed is above 5 mph, and
- Wind direction or activity would carry pesticides toward, or deposit them upon open water.

Pesticides Available

To more clearly regulate any possible aquatic impacts, the pesticides available for use in buffers and aquatic sites will be reduced in scope from the general park list. Only aquatic-labeled pesticides may be used within buffer zones or waterways. Choice of pesticides utilized take into account any possible effects on aquatic life as well as tendencies to move in the environment. In addition, applicators must research the impacts of each pesticide before use and get approval from the direct supervisor.

Materials available for tree injections in buffer zones:

In the event a pest or disease threatens the health of important and valuable trees within a buffer zone, there may be a need to treat them. Instances of this occurring are rare. However, in these special cases, the use of injectable pesticides may be employed when necessary, with the following limitations. The pesticide applied must be delivered by methods that inject or otherwise distribute the material entirely within interior tree tissues. Pesticides will not be injected into the soil surrounding the tree. Tree surfaces will not be sprayed or treated with pesticides. The insecticides and fungicides used in these injection systems shall be approved by the PARD Manager in consultation with the Watershed Protection Coordinator and the Urban Forrester. The intent and limit of this exception to the approved buffer zone pesticide list is to allow only the insecticides or fungicides necessary to combat direct threats to the health of valuable trees.

Materials for all other areas:

Approved pesticides may be used outside the waterway and buffer zones, where not otherwise prohibited by this Strategy.

Recordkeeping Requirements

All regular application recordkeeping requirements will be adhered to for all pesticide applications. This includes date and the time intervals of the application, temperature and wind conditions, location of application, materials used, concentrations used, amount applied, coverage rate, equipment used, applicator full name and license number. In the event an unlicensed staff member performs an application under the license of a holder, the unlicensed staff member's full name will be included in the records.

Personnel Requirements

All those applying pesticides must be Texas Department of Agriculture licensed applicators. Application of pesticides to aquatic sites will only be done by licensed personnel who have received an additional aquatics license certification.

Changes to the Strategy

A need may arise for modifications or additions to this Strategy. There are several methods available to accomplish this. PARD representatives will develop an IPM strategy to deal with the threat. If this strategy involves the need for any pesticide applications within buffer zones or waterways that are not already outlined in the current Strategy, PARD will consult with Watershed Protection regarding the proposed modifications.

STRATEGY 16: Vegetation Management in Engineered Wood Fiber Playground Areas

PURPOSE

This Strategy defines acceptable practices for managing vegetation in playgrounds areas. In all our IPM activities, PARD seeks to minimize any potential impacts to our park users while still providing responsible, effective, and efficient care for our facilities. Engineered Wood Fiber (EWF) playground areas focus attention on our activities and require a special set of best management practices to benefit both PARD and park users.

BACKGROUND

The Department is transitioning over to Engineered Wood Fiber (EWF) as its preferred playground safety surface. EWF is from a virgin wood source and must prove to be non-toxic and free of foreign debris. It is comprised of randomly sized wood fibers, the majority of which do not exceed 4 inches in length and meets ASTM and CPSC guidelines for safety surfacing and ADA accessibility. As EWF consists of specially manufactured wood chips, they also pose a special need for more attention for staff to address the following approved vegetation management methods and materials in these specific areas.

STRATEGY

All PARD personnel are required to adhere to this Strategy when they are undertaking weed management activities in playground areas and their immediate borders or margins. Weed control in these play areas will be accomplished primarily through the use of the wood chip mulch over layered rock and weed fabric. To function as both a safe surface for play and as an effective weed barrier, this chip layer should be kept at the established specification depth. If the mulch layer is not adequate for weed control it should be amended as soon as is practicable. Mulch layers that have broken down over time and provide a medium for good weed growth should be replaced or amended with fresh chips. Spraying of herbicides will not be used to control vegetation in play areas.

Manual weeding is usually adequate to keep weeds from establishing within the chipped areas. Effort shall be made to respond quickly to weed presence so that this kind of control will be feasible and effective.

Specifications for layering of weed barrier material are as follows:

- Weed fabric barrier over leveled ground
- 2" diameter rock at 4-6 inches in depth
- Weed fabric barrier over rock layer
- EWF at 9-12 inches in depth

Use of powered weed control equipment, such as line trimmers and tillers, may be used in chipped areas to control weeds, but careful attention to the dangers they present must be taken. This kind of equipment should not be used when nearby park users may be put at risk. Playground/turf interface borders will be maintained by hand or mechanical means. Establishment of a structured border is preferred and encouraged for installation where possible as it provides a lower maintenance interface between play areas and turf. These structures also reduce weed and turf infiltration.

The need to control other pests, such as insects or diseases, can occur. One example would be the presence of stinging insects such as yellowjackets and fire ants in the play area. In these circumstances,

the use of a targeted insecticide to eliminate the immediate safety hazard may be required. All other applicable pest management policies and approved pesticide lists apply in this case.

STRATEGY 17: Venomous Insect Management

PURPOSE

This Strategy defines acceptable practices for managing venomous insects such as hornets, wasps, yellow jackets, bees, and fire ants in COD landscapes and grounds. While these insects will not always cause problems, their presence in some locations, such as playgrounds, can create immediate and serious public and staff safety issues. More importantly, individuals with bee and wasp venom allergies may be presented with life-threatening situations if they are stung. To properly address these safety concerns, employees may be faced with the need to apply insecticides within a short time frame. These control activities and use of insecticide require adherence to the special rules outlined in this Strategy.

BACKGROUND

Wasps, hornets and yellow jackets may quickly establish nests above and below ground in both natural areas and in developed parks. Not every wasp or bee nest creates a problem for our users or staff. Public threat is dependent on insect species, nest location, time of year and other factors.

Yellowjackets and some wasp species can be particularly aggressive towards people, especially near their nests. Other wasps, such as paper wasps are less aggressive and are more benign depending on location of their nest. Honeybee swarms generally do not create a large stinging potential as bee behavior is altered during this time. Nest location is also important when determining threat. Nests located near walkways, buildings, playgrounds or similar sites are more problematic than those located in remote areas. Nests in areas where vegetation management or restoration planting is being carried out can also create problems. Wasp behavior may also vary with the time of year. Yellowjackets will exhibit increased defensive behavior as the season progresses. Normally, yellowjacket and paper wasp colonies only live one season. Honeybee nests usually persist from year to year.

Red imported fire ants or *Solenopsis invicta* are an invasive species common in many areas of Texas. Red imported fire ants are very aggressive, deliver painful stings, and can pose a threat to people, animals, and plants. The ants are normally found in mounds but can also nest deeper in the ground. There is no method of eradication and control can be difficult if not treated properly.

STRATEGY

Evaluation

When wasp or bee nests and fire ant mounds are discovered on COD property, staff should evaluate the safety threat they pose. If the nest or mound is considered to create a safety hazard for park users or staff, isolation and control measures should take place. Nests and mounds that create an immediate hazard, such as those near playgrounds, community centers, walkways, trails and work sites, should be addressed as soon as possible. Other criteria that may constitute a hazard are nests and mounds that have been disturbed and sites with aggressive insects. Nests occurring within inhabited structures such as community centers create an immediate safety hazard and control of these should be immediately referred to a qualified professional contractor.

Isolating nests or swarms

Where possible, nests or swarms that present an immediate public hazard should be isolated by either signage, cones, taping, flagging, or by other means, so that the area of danger can be avoided. The barriers used in isolating the insects should stay in place until the nest is eliminated or the swarm is removed. Make sure that signage is in place to warn the public.

Honeybee swarms and nests

When discovered, honeybee swarms should be marked as described above until the bees have been collected. Qualified bee removal businesses should be contacted to collect the swarm. Honeybee swarms should not be sprayed with insecticides. Unless location of the nest presents a hazard, honeybee nests should be tolerated where possible. If removal is required, qualified contractors should physically remove nests when feasible. Spraying of honeybee nests should be a last resort.

Spraying wasp and hornet nests

Aerosol jet stream products labeled for use on wasp and hornet nests can be effective against both yellow jackets and paper wasps, but they must be used with extreme caution. Non-toxic and non-chemical products can also be effective in eliminating nests. Wasps will attack when they sense an application to their nests, and even freeze-type products are not guaranteed to stop every individual. For this reason, **extreme caution** must be used when nest applications are taking place. The following practices should be adhered to:

- Nests should be sprayed at night or before dawn, when all members of the hive are present and most passive. Daytime spraying is not recommended except in certain emergency cases where the public is not placed at risk from increased hive activity.
- Nests should not be disturbed before treatment. Disturbed nests should not be approached.
- Nest location should be isolated as described above. Isolated area devices must be left up until the nest has been eradicated.
- Nests that are situated high in trees, or in otherwise difficult to access locations should be treated by professional contractors, or by qualified staff in the Urban Forestry department. Do not attempt to control a nest if you cannot easily do so.
- Nests in structures, building, tree cavities, etc., should be treated by professional contractors only.
- Staff may use a non-toxic formula or wasp and hornet spray that is available at the local store, providing that they follow the directions on the label for use. Approved sprays will contain synthetic pyrethroids as their active ingredient. Products with other active ingredients are not approved for use by staff.
- All applications shall be documented as per the Strategy 6: Pesticide Application Recordkeeping.

Approved applicators

In general, staff with valid TDA pesticide applicator licenses with an insecticide category endorsement should be the designated employees carrying out applications. However, there may be instances where these employees are not available, and a nest presents an immediate health and safety threat to the public or staff. In these instances, available personnel with TDA pesticide applicator licenses of any category are approved to use jet spray wasp and hornet products to treat nests. In rare emergency safety situations where no licensed personnel are able to respond in a timely fashion, other personnel may be approved to carry out an application, but only if they have had prior supervisor approval, prior training in the safe use of these sprays, and instruction in the proper management of wasps and bees. Staff members with known wasp or bee allergies will not carry out any wasp or bee control.

Use of traps

When venomous insects are a continuing serious problem at a site from year to year, use of traps to target emerging queens/ swarms can be considered. Trapping queens / swarms during the emergence

period has the potential to provide an overall reduction in the venomous insect population for the season. Traps should be installed, monitored, and removed by experienced staff or under Texas Apiary Inspection Service (TAIS) permitted activity.

Fire ants

For an effective long-term treatment of fire ants, AgrLife Extension recommends using a two-step method of broadcast applications of bait followed by individual mound treatments when necessary. The broadcast treatment of ant bait is recommended in the spring and fall, followed by individual mound treatments on an as-needed basis. The individual mound treatment can be performed with a liquid drench, dust, or granular form of insecticide.

STRATEGY 18: Dog Area Pest Management

PURPOSE

This Strategy defines acceptable practices for managing pests in City of Denton dog parks. Park users are invited to bring their dogs to recreate in the parks, either as a designated off-leash area (OLA), or as an on-leash area, therefore pest management in these areas needs to reflect this use. Pest management decisions, methods, and material use should be carried out in a way that maintains public and dog safety and allows for responsible stewardship of park property.

BACKGROUND

There are many sites in the City of Denton parks, some are fenced, some are unfenced, and all are open from 6 AM to 10 PM. All sites are signed with dogs on or off leash. For the purposes of this Strategy, OLA sites consist of:

1. An officially designated fenced dog off-leash area, including the fence line.
2. An officially designated unfenced dog off-leash area within the boundary markers.

By their nature, and from the impact of concentrated dog activity, OLAs can create pest management problems such as increased weeds in turf and the need to control weeds along fence lines. Other pest issues that arise in OLAs are the presence of noxious, poisonous, allergenic, or incompatible weeds, venomous insects, and parasitic insects (fleas) and arachnids (ticks). Proper management of these pests needs to be clearly defined to minimize any potential risks to dogs and their owners and to minimize interference with OLA use by the public.

STRATEGY

Expected pest management issues arising in the OLAs consist of:

- Weeds along fence lines, in tree circles, in shrub beds, around park structures and amenities, and in the turf.
- Management of allergenic or poisonous weeds such as poison ivy.
- Venomous insect management.
- Fleas and ticks

OLAs may need to be closed temporarily so that necessary maintenance work can be performed. Temporary signage will be located at OLA boundaries or fencing to alert users in advance of closures. Pesticide applications will be accompanied by notification signage and mandated reentry intervals as defined in Strategy #4 (Notification of Pesticide Use at a Site).

Herbicide use in fenced OLAs

When it is necessary to apply herbicides within fenced OLAs, great care should be used to time and locate the application to minimize interference with public use. Ideally herbicide use should be as infrequent as possible and would take place when dogs are not present. When herbicides are to be used inside fenced OLAs or along the interior or immediate exterior of their fence lines, the OLA should be closed, and dogs excluded. Closure should be maintained until the reentry requirements as mandated on the product label have been satisfied. This interval typically requires that people and pets be kept out of the area until the sprayed surface has dried. Normal application notification signage as mandated in Strategy #4 should be used. To the extent possible, additional temporary signage will be located outside OLA fencing to alert users in advance of closures.

Herbicide use in unfenced OLAs

When it is necessary to apply herbicides within unfenced OLAs, great care should be used to time and locate the application to minimize interference with public use. Ideally herbicide use should be as infrequent as possible and would take place when dogs are not present. Standard notification as mandated in Strategy #4 (Notification of Pesticide Use at a Site) must be employed. Label directives for reentry must be adhered to, and dogs and people must be excluded from application areas until the interval has been satisfied. Since unleashed dogs are difficult to exclude from large areas, this may necessitate applications that are small in scope to allow for this level of oversight. To the extent possible, additional temporary signage will be located outside OLA boundaries to alert users.

Turf broadleaf control

OLAs taken out of service may receive selective herbicides as part of an overall turf renovation program but only within the oversight of Strategy 16: Turf Broadleaf Weed Management and the specific approval process it requires.

Use of pre-emergent herbicides

To be an effective barrier to weed seed germination, pre-emergent herbicide sites need to be left undisturbed after they are applied. Since the activity of dogs in an OLA disturbs soil surfaces and reduces or eliminates the effectiveness of a pre-emergent application, their use in areas of concentrated disturbance sites, such as fenced OLAs, is often not effective. However, there may be need for pre-emergent use in less intensively impacted areas.

Insecticide use

As is the case at most park properties, general insecticide use is not expected in areas that dogs are permitted to be, either as an off-leash or on-leash area. However, there may be emergency situations created by the presence of venomous insects such as yellow jackets, wasps, bees, fire ants, fleas, and ticks. These pests can create serious safety issues for people and their pets. Control of venomous insects must take place as described in the Venomous Insect Management Strategy. Nest demarcation guidelines and the response process as described in that Strategy are of heightened importance in these areas since dogs not in control by their owners may be at increased risk from an active nest site. Any use of insecticides to manage other identified best will be performed under the guidelines of applicable strategies and the approved product list.

Mechanical equipment

All aspects of park user safety and dog safety should be considered when determining a particular weed control method for a given site. Mechanized weed control equipment such as string trimmers can create hazards such as flying rocks and debris. Dogs may be at risk when they approach the work area. Care should be exercised when using this equipment.

The use of disposable bags to collect dog feces assists in the management of insects and other pests. PARD requires all pet owners to collect and dispose of dog feces on park property. This requirement is enforced through City ordinance and posted park rules. Disposable bag dispensers are available at designated dog parks and throughout the park system. Additionally, PARD may schedule additional clean-ups to assist in this effort.

STRATEGY 19: Insecticide Use and Pollinator Protection

PURPOSE

This Strategy defines acceptable practices in the management of insects that consider the health and well-being of pollinators and enhances habitats.

BACKGROUND

The City has been a member of Bee City USA since 2016, and the City became the first Monarch City USA in Texas in 2018. Pollinators, including bees and other insects, play a vital function in both agricultural and natural systems. Their conservation is an important element in the IPM program. Use of any insecticide in the landscape has the potential to impact pollinators in both direct and indirect ways, therefore great care must be taken when considering the use of any insecticide. In most cases, insects do not threaten the long-term health or viability of turf, trees and shrubs and do not require active management. This strategy provides a process to begin to determine if an insect pest should be managed, and if so, what method or material is the most responsible choice.

STRATEGY

INSECT MANAGEMENT DECISION MAKING ELEMENTS:

A. Assess insect impact and significance

The significance of problematic insect impacts must be determined before active management is considered. The primary IPM approach to insect management is to tolerate the presence of the insect where possible. The vast majority of insect infestations do not threaten the long-term health or viability of park trees and shrubs. Many are simple nuisance infestations or cause only marginal harm. Others may present only short-term impacts or are merely unsightly. These kinds of insect problems do not threaten the intended function of the green asset to a significant degree. The proper IPM approach for these pests is tolerance of the pest, or replacement of the plant with a non-susceptible plant when possible. Therefore, in these instances, insecticide use is not warranted.

Insecticide use can be considered for pests that present significant risks to the long-term viability or essential function of important plant assets. They can also be considered for use in the case of insects that threaten the health and safety of citizens in which case response may need to be rapid and effective. The way these insecticides are chosen and employed must adhere to the careful pollinator stewardship practices detailed within this policy.

B. Evaluate all IPM methods and materials

If insect control interventions are determined to be required, all IPM approaches must first be evaluated for suitability. These include:

1. **Planning/Design:** Where feasible, eliminate the problematic plants and replace them with naturally resistant plants. If a plant is unsuitable for the conditions at a site, it may increase its susceptibility to a specific insect problem. The best long term IPM approach is to employ plants suited to the existing growing conditions.
2. **Cultural:** Cultural practices that either improve the growing conditions or are protective of the planting can be important elements in the management of some kinds of insects.
3. **Physical:** Various physical approaches such as the use of barriers are generally minimal in impact to non-targets and may offer adequate control of certain pests.
4. **Biological:** For certain insect pests, a reliance on biological controls may be possible. Where feasible, this can offer the ideal long-term solution to pest problems. Special attention to good

stewardship of naturally occurring insect predators should be made. There are also instances where commercially reared insect predators can be released to combat a specific pest.

5. **Natural and synthetically derived insecticides:** Insecticides can be part of an IPM approach, but careful attention must be made in choice and use. In general, the least ecologically disruptive and lowest risk materials should be favored but the full complexity of IPM assessment rationale must be considered before choice and use. These considerations include but are not limited to:
 - a. Potential safety and health risks of the product as it will be applied, both in the short and long term.
 - b. Potential environmental risks, including risks to non-target organisms including bees and pollinators.
 - c. Potential disruption of the landscape, garden, natural area, and urban forest ecosystems including impacts on natural insect predators.
 - d. Individual insecticide characteristics such as toxicity, persistence, bioavailability, break down products, volatility, inert ingredients, and environmental movement.
 - e. Differing application methods, such as injections, sprays, and drenches.
 - f. Efficacy of the insecticide, and the need for repeated treatments.
 - g. Feasibility of use to address a specific pest.
 - h. PARD will not approve the use of neonicotinoid products or other insecticides used in such a way as to pose unacceptable risk to non-targeted bees or other pollinators.

APPENDICES

APPENDIX 1: Approved Pesticide List for City Property and Parks Use

Following are lists of pesticides that are approved for use on City and park property. A comprehensive IPM approach allows for the choice of ideal materials for specific needs. IPM also anticipates the need to managing pest resistance with rotations of products with differing modes of action rather than relying on a “one material fits all” approach. Most of the pesticides are not used in a typical year or are used in a minimal way.

It is also important to understand that pesticide applications are used after many other IPM strategies have first been either employed or considered. Most pest management practices never involve the use of pesticides. Similarly, a majority of land never receives any kind of pesticide application. Other IPM strategies the City employs include prevention of pests through strategy, design and selection, and management of pests through cultural practices, physical means, and mechanical methods.

All pesticides available for use must first be placed upon an approved list after undergoing a review process that carefully examines the individual characteristics of the product and whether it would be an appropriate addition within our program. Issues of efficacy, public health and safety, potential environmental impacts, overall plant health requirements, land management needs, and other concerns are taken into account during this process. Applicators within a specific work unit must then make their choices of materials from their own approved list. Individual work units have different responsibilities and pest management requirements for the lands under their care. The individually tailored approved lists reflect these differences.

The following lists of approved pesticide materials are specific to each work unit. Applicators must choose only from currently listed products. Only state licensed applicators may apply pesticides on City property. Use of pesticides by non-licensed personnel, such as, but not inclusive of, wasp spray and fire ant powder, may be used as an incidental application. Use of pesticides must occur under adherence to the Integrated Pest Management Plan and program policies and oversight. Pesticide use must adhere to all product label directions.

Format:

Active ingredient / concentrations / product trade name / signal word / description of purpose and use within IPM program.

COD USE APPROVED LIST

Areas of pest management: Pocket, neighborhood, community, and city parks. Open space / trails. Cemeteries. Landscaping. Facility turf lawns. Utility property. Right-of-ways.

Active Ingredient(s)	Concentration(s)	Product Name	Signal Word	Description
Herbicides				
Thiencarbazone-methyl, Iodosulfuron-methyl-sodium, Dicamba	8.7% / 1.9% / 57.4%	Celsius WG	Caution	Safe and effective control of both a large list of broadleaves and many grassy weeds. This is our primary choice due to its effectiveness and safety level.
Sulfosulfuron	75%	Certainty	Caution	Controls many grassy weeds. It will be used primarily for nutsedge, both purple and yellow.
Glufosinate ammonium	24.50%	Cheetah Pro	Caution	Control of undesirable plant vegetation, including emerged annual and perennial grass, sedge and broadleaf weeds.
Corn kernel, protein based nitrogen	9.8% / 60%	Corn Gluten Meal	N/A	Pre-emergent to control broadleaf and grassy weeds
Iron HEDTA (FeHEDTA)	26.52%	Fiesta	Caution	Controls broadleaf weeds, disease, moss, algae, and lichens in turf through iron toxicity. Not for application in temperatures greater than 85.

Fluazifop-P-butyl	24.50%	Fusilade	Caution	Selective post emergent that controls unwanted perennial and annual grass weeds such as Bermuda grass without injuring desirable broadleaf plants; primarily used in landscape beds.
Isoxaben	75%	Gallery 75 DF	Caution	Used on shrub beds, tree circles, and other areas. Can be used in combination or rotation with oryzalin to broaden the spectrum of weeds prevented.
Triclopyr: 3,5,6-trichloro-2-pyridinyloxyacetic acid, butoxyethyl ester	61.60%	Garlon 4	Caution	Selective products for woody, difficult to control perennials, also for invasives and habitat restoration.
Halosulfuron-methyl	75%	Halo 75 WDG	Caution	Selective pre and post emergent control of broadleaf weeds and nutsedge.
Acetic Acid	10%	Horticultural vinegar		Post emergent used to control unwanted plants.
Pendimethalin	2%	Pendulum 2G	Caution / Precaution	Pre-emergent control of most annual grasses and certain broadleaf weeds as they germinate in any turfgrass site (lawns, sod, turf areas).

Pendimethalin	37.40%	Pendulum 3.3 EC Herbicide	Caution / Precaution	Pre-emergent control of most annual grasses and certain broadleaf weeds as they germinate in any turfgrass site (lawns, sod, turf areas).
Isopropylamine salt of Imazapyr	27.7%	Polaris	Caution	Post-emergent management of grasses and broadleaf weeds and undesirable aquatic vegetation.
Prodiamine	40.70%	Prodiamine 4L	Caution	Pre-emergent weed control, especially effective on <i>Poa annua</i> (annual bluegrass) in the fall and winter.
Triclopyr	60.45%	Remedy Ultra	Caution	Selective products for woody, difficult to control perennials, also for invasives and habitat restoration.
Diquat dibromide	37.30%	Reward	Caution	Non-selective herbicide that manages weed problems in aquatic, ground maintenance, and landscaping areas.
Oxadiazon	34.10%	Ronstar FLO	Caution	A pre-emergent for control of many annual grasses and broadleaf weeds such as crabgrass, goose grass, field sandbur, annual sedge and bluegrass.

Oxadiazon	1.38%	5-0-15 w/Ronstar	Caution	Pre-emergent mixed with fertilizer.
Halosulfuron-methyl methyl 3-chloro-5, -- methylpyrazole-4-carboxylate	75% / 25%	Sedghammer	Caution	Nutsedge control.
Trifluralin, isoxaben	2% / 0.5%	Snapshot 2.5TG	Caution	Pre-emergent product for control of certain broadleaf weeds and annual grasses in shrub and groundcover areas as well as the mulch area of perennial beds.
Flumioxazin	51%	Sureguard	Caution	A pre-emergence and early post-emergence herbicide for control of selected grass and broadleaf weeds.
Oryzalin	40.40%	Surflan AS, WDG	Caution / Precaution	Used in shrub beds, tree circles, fence lines and other park areas for weed control. A primary liquid form pre-emergent product.
Benefin, Oryzalin	1% / 1%	Surflan XL 2G	Caution / Precaution	Used in shrub beds, tree circles, fence lines and other park areas for weed control. A primary liquid form pre-emergent product.
Mesotrione	40%	Tenacity	Caution	Selective contact and residual control of weeds in ornamental turfgrasses.

Picloram	24.40%	Tordon K	Caution	Used to control weeds, unwanted brush and trees e.g. Chinese privet.
Thiencarbazone-methyl, Foramsulfuron, Halosulfuron-methyl	9.9% / 19.8% / 30.8%	TributeTotal	Caution	A combination of Celsius, Sedghammer and Revolver; most effective in controlling dallisgrass in the fall.
Dithiopyr	24%	Dimension	Warning	Pre-emergent product with some post control of goose grass in the 2-3 leaf stage.
Ammonium Nonanoate	40%	Mirimichi Green	Warning	Control or burndown of weeds and grasses.
Oxadiazon-3	2%	Ronstar G	Warning	Used in shrub beds, tree circles, fence lines and other park areas for weed control. A primary liquid form pre-emergent product.
Pelargonic acid, related fatty acids	57% / 3%	Scythe	Warning	Minor use desiccant used for top-kill of early-stage, easily killed weeds.
Indiaziflam	7.40%	Specticle FLO	Warning	Pre-emergent weed control with the longest residual (up to 6 months) of any other pre-emergent herbicide

Triclopyr, Clopyralid	33% / 12.1%	Confront	Danger	Selective products for woody, difficult to control perennials, also for invasives and habitat restoration.
Fungicides				
Streptomyces lydicus WYEC 108	0.04%	Actinovate	Caution	A biological fungicide for the suppression of root rot and damping-off fungi and the suppression/control of foliar fungal pathogens
Thiabendazole hypophosphite	26.60%	Arbotec 20-S	Caution	Trunk injection product for certain high value elms.
Bacillus amyloliquifaciens strain D747	25%	DoubleNickel 55		OMRI a broad-spectrum preventative biofungicide for control or suppression of fungal and bacterial plant diseases.
Mefenoxam	22%	Subdue Maxx	Caution	A turfgrass disease control for Pythium blight.
Propiconazole	14.30%	Alamo	Warning	Trunk injection product for certain high value elms.
Etridiazole, Thiophanate-methyl	15% / 25%	Banrot 40 WP	Warning	A broad spectrum fungicide that will control root and stem rot diseases caused by Rhizoctonia, Phytophthora, Pythium,

				Fusarium, and Thielaviopsis.
Chlorothalonil	82.50%	Daconil	Danger	Controls various fungal diseases including anthracnose, leaf spots, blights, and rots on many different species of plants.
Insecticides				
Acephate	75%	Acephate WSP	Caution	Acephate is reserved for use in the treatment of severe infestations of aphids, leaf miners, caterpillars, sawflies, thrips, and the individual treatment of red imported fire ant mounds.
Indoxacarb	0.05%	Advion	Caution	Fire ant bait. It'll only effect the ants and eradicates them in 24-72 hours. It is an extremely safe product that protects patrons and pets from fire ants.
Azadirachtin	3%	Azatin XL	Caution	Neem tree extract used for insect growth regulating and anti-feeding effects. Typically not used, but retained for unusual, short term use where long term plant health is affected.

Steinernema feltiae, Steinernema carpocapsae and Heterorhabditis bacteriophora	N/A	Beneficial nematodes	N/A	Naturally occur in soil and are used to control soil pest insects and whenever larvae or grubs are present. Do not expose humans or animals to any health or environmental risks. Beneficial nematodes only attack soil dwelling insects and leave plants and earthworms alone.
Bacillus thuringiensis		Bt - asst'd (BTI Briquets)	Caution	Used to control mosquito and fly larva in standing water primarily ponds, streams, and around retainage / drainage areas. Product is usually in the form of a briquette.
Spinosad	11.60%	Conserve	N/A	Typically not used, but retained for unusual, short term use where long term plant health is affected.
Deltamethrin	2%	DeltaGard	Caution	Low dose granules to control ants, armyworms, centipedes, chiggers, chinchbugs, cockroaches, field and mole crickets, beetles, scorpions, spiders, and ticks.

Deltamethrin	0.10%	DeltaGard G	Caution	Low dose granules to control ants, armyworms, centipedes, chiggers, chinchbugs, cockroaches, field and mole crickets, beetles, scorpions, spiders, and ticks.
Sugar, fiber, ash, protein, fat	42%/25%/14%/5%/ .3%	Dry Molasses	N/A	Ant control.
Tetramethrin, Permethrin, Piperonyl butoxide	0.1% / 0.25% / 0.5%	Enforcer	Caution	Directed jet sprays used for individual wasp and hornet nest treatments posing health and safety threats to park users.
Peppermint oil, sodium lauryl sulfate	1.5% / .15%	Essentria Wasp and Hornet Spray	Caution	Wasps, hornets, yellow jackets, and spiders
(S)-Methoprene	0.50%	Extinguish	Caution	Bait used to control imported and native fire ants.
Bacillus thuringiensis subsp. galleriae, Strain SDS-502 fermentation solids, spores and insecticidal toxins	9%	GrubGone	Caution	All season control of grubs.
Petroleum based		Horticultural Oils	N/A	(Sun Spray, Dormant Oil) - Primarily used as "dormant oils" applied before bud break in the spring to control pests on fruit and shade trees. Dormant oils are very effective against the eggs of certain mites,

				aphids, and scale insects that overwinter on fruit and shade trees. A new generation of more highly refined horticultural oils also known as "all seasons spray oils" or "summer oils" can be safely used on many plants during the growing season.
Nosema Locustae	0.05%	Nolo Bait	N/A	Controls grasshoppers.
Lacewig flies	Bio-control agent	Lacewig flies	N/A	Feed on aphids.
Imidacloprid	75%	Lada 75WSP	Caution	Versatile insecticide registered to control over 50 insect pest including aphids, lacebugs, leaf beetles, and leafminers.
Ladybugs	Bio-control agent	Ladybugs	N/A	Feed on aphids.
Praying mantis	Bio-control agent	Praying mantis	N/A	Used to control beetles, flies, caterpillars, wasps, and other insects
Cinnamon oil, clove oil	40% / 10%	Pure Gro Bug Stop	N/A	Mites, whiteflies, aphids, scales, trips, weevils, leafminers.
Bifenthrin	7.90%	Talstar	Caution	Termite, ant, bees, and wasp control.

Fipronil	0.014%	Top Choice Fire Ant Bait	Caution	Primary purpose is to control imported fire ants in turf grass and landscape beds. Mole crickets, fleas, ticks, and nuisance ants are controlled for a limited time.
Cyfluthrin	11.80%	Tempo SC Ultra	Caution	Used against flying pests such as wasps and yellow jackets, crawling pests like ants and centipedes, as well as various beetles and moths.
Trichogramma Wasp Eggs	Bio-control agent	Trichogramma Wasp Eggs	N/A	Controls plant / leaf damaging caterpillars and worms.
Emamectin benzoate	4%	Tree-age Injectable	Warning	Used as a systemic trunk injection to treat emerald ash borers.
Potassium salts of fatty acids	49%	M-Pede	Warning	General soft body insect control. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Potassium salts of fatty acids	49.52%	Safer Soap	Warning	General soft body insect control. Typically not used, but retained for unusual, short term use where long term plant health is affected.

Miticides				
Bifenazate	22.60%	Floramite SC	Caution	Miticide as part of a carefully implemented plan to keep mites at non- injurious levels. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Tau-fluvalinate	22.30%	Mavrik	Caution	For control of various mites, worms, weevils, and beetles as well as whiteflies, ants, crickets, and chiggers.
Abamectin	2%	Avid	Warning	For control of leafminers and mites and suppression of aphids, whiteflies, and thrips on ornamental plants.
Rodenticide				
Diphacinone	0.01%	Bait Block	Caution	Used to control rodents such as mice and rats.
Bromethalin, Diphacinone	.01% / .005%	Just 1 Bite	Caution	Used to control rodents such as mice and rats.
Miscellaneous				
Water soluble blue dye		Blue Spray Pattern Dye	Caution	Color dye used for application to all types of turfgrasses to make spray patterns visible.

Ethylated seed oil; polyoxyalkylene fatty ester	100%	Hasten EA adjuvant	None	Surfactant used in solutions to enhance spray coverage and increase efficacy.
2-Hydroxy-1,2,3-Propanetricarboxylic Acid, Calcium Chloride	25% / 9%	Tri-Fol Acidifier and Buffering Agent	Caution	OMRI Organic acidulate and buffering agent for lowering the pH of spray water.
Blue colorant, proprietary proportions		Turf Trax Blue Dye	Caution	Color dye used for application to all types of turfgrasses to make spray patterns visible.
Trinexapac-ethyl	11.30%	Primo Maxx PGR	Caution	For managing growth, improving quality and stress tolerance, and edging of warm and cool season turfgrasses.
Alkylphenol ethoxylate, alcohol ethoxylate and tall oil fatty acid	90%	Activator 90	Warning	Low-foaming, non-ionic type spreader adjuvant. Provides quick wetting, more uniform distribution, and increases retention of spray by reducing surface tension on the spray droplets.
Polyether-Polymethylsiloxane-Copolymer and Polyether	100%	Syl-Coat	Warning	OMRI Nonionic silicone surfactant specifically designed to enhance the efficacy of pesticides. Particularly effective when used with water-

				soluble and post emergent herbicides by completely wetting leaf surface and increasing amount/rate of uptake. Most evident on broadleaf and woody brush species.
Alkylaryl polyethoxy ethanol, free fatty acids	93%	Tradition 93 Non-Ionic Surfactant	Warning	A wetting agent that helps soils to quickly and evenly absorb water by breaking the water's surface tension, allowing water molecules to spread for greater and faster water penetration. As a wetting agent, nonionic surfactants are often mixed in with potting media to ensure easy water absorption into plant soil.

Dimethylpolysiloxane, Methylated silicon	7.7% / 2.3%	Fast Break Antifoamer / Defoamer	Warning	Used to provide effective, high performance foam control at very low concentrations under normal foaming situations in recirculating sprayers and in other high agitation equipment.
Polyethylene glycol mono ether	90%	R-11	Warning	Specially formulated for increasing the efficacy of various agricultural chemicals. Designed for use where quick wetting and uniform coverage of a chemical on a target surface is required.
Silicic acid, sodium salt, sodium carbonate, silicon dioxide, proprietary compounds, polyethoxylate		Neutralize Tank Cleaner	Danger	A cleaning and rinsing agent used to remove pesticide residues from spray equipment. Proper cleaning of equipment helps to reduce exposure to products, avoid cross contamination of incompatible products, and prevents damage to rubber, plastic, and other soft sprayer parts.

APPENDIX 2: Athletic Field Services Approved List

Areas of pest management: Athletic fields such as softball, baseball, football, and soccer fields.

Active Ingredient(s)	Concentration(s)	Product Name	Signal Word	Description
Herbicides				
Thiencarbazone-methyl, Iodosulfuron-methyl-sodium, Dicamba	8.7% / 1.9% / 57.4%	Celsius WG	Caution	Safe and effective control of both a large list of broadleaves and many grassy weeds. This is our primary choice due to its effectiveness and safety level.
Sulfosulfuron	75%	Certainty	Caution	Controls many grassy weeds. It will be used primarily for nutsedge, both purple and yellow.
Glufosinate ammonium	24.50%	Cheetah Pro	Caution	Control of undesirable plant vegetation, including emerged annual and perennial grass, sedge and broadleaf weeds.
Corn kernel, protein based nitrogen	9.8% / 60%	Corn Gluten Meal	N/A	Pre-emergent to control broadleaf and grassy weeds
Iron HEDTA (FeHEDTA)	26.52%	Fiesta	Caution	Controls broadleaf weeds, disease, moss, algae, and lichens in turf through iron toxicity. Not for application in temperatures greater than 85.

Fluazifop-P-butyl	24.50%	Fusilade	Caution	Selective post emergent that controls unwanted perennial and annual grass weeds such as Bermuda grass without injuring desirable broadleaf plants; primarily used in landscape beds.
Isoxaben	75%	Gallery 75 DF	Caution	Used on shrub beds, tree circles, and other areas. Can be used in combination or rotation with oryzalin to broaden the spectrum of weeds prevented.
Triclopyr: 3,5,6-trichloro-2-pyridinyloxyacetic acid, butoxyethyl ester	61.60%	Garlon 4	Caution	Selective products for woody, difficult to control perennials, also for invasives and habitat restoration.
Halosulfuron-methyl	75%	Halo 75 WDG	Caution	Selective pre and post emergent control of broadleaf weeds and nutsedge.
Acetic Acid	10%	Horticultural vinegar		Post emergent used to control unwanted plants.
Pendimethalin	2%	Pendulum 2G	Caution / Precaution	Pre-emergent control of most annual grasses and certain broadleaf weeds as they germinate in any turfgrass site (lawns, sod, turf areas).

Pendimethalin	37.40%	Pendulum 3.3 EC Herbicide	Caution / Precaution	Pre-emergent control of most annual grasses and certain broadleaf weeds as they germinate in any turfgrass site (lawns, sod, turf areas).
Prodiamine	40.70%	Prodiamine 4L	Caution	Pre-emergent weed control, especially effective on Poa annua (annual bluegrass) in the fall and winter.
Diquat dibromide	37.30%	Reward	Caution	Non-selective herbicide that manages weed problems in aquatic, ground maintenance, and landscaping areas.
Oxadiazon	34.10%	Ronstar FLO	Caution	A pre-emergent for control of many annual grasses and broadleaf weeds such as crabgrass, goose grass, field sandbur, annual sedge and bluegrass.
Oxadiazon	1.38%	5-0-15 w/Ronstar	Caution	Pre-emergent mixed with fertilizer.
Halosulfuron-methyl methyl 3-chloro-5, -- methylpyrazole-4- carboxylate	75% / 25%	Sedghammer	Caution	Nutsedge control.

Trifluralin, isoxaben	2% / 0.5%	Snapshot 2.5TG	Caution	Pre-emergent product for control of certain broadleaf weeds and annual grasses in shrub and groundcover areas as well as the mulch area of perennial beds.
Flumioxazin	51%	Sureguard	Caution	A pre-emergence and early post-emergence herbicide for control of selected grass and broadleaf weeds.
Oryzalin	40.40%	Surflan AS, WDG	Caution / Precaution	Used in shrub beds, tree circles, fence lines and other park areas for weed control. A primary liquid form pre-emergent product.
Benefin, Oryzalin	1% / 1%	Surflan XL 2G	Caution / Precaution	Used in shrub beds, tree circles, fence lines and other park areas for weed control. A primary liquid form pre-emergent product.
Mesotrione	40%	Tenacity	Caution	Selective contact and residual control of weeds in ornamental turfgrasses.

Thiencarbazone-methyl, Foramsulfuron, Halosulfuron-methyl	9.9% / 19.8% / 30.8%	TributeTotal	Caution	A combination of Celsius, Sedghammer and Revolver; most effective in controlling dallisgrass in the fall.
Dithiopyr	24%	Dimension	Warning	Pre-emergent product with some post control of goose grass in the 2-3 leaf stage.
Ammonium Nonanoate	40%	Mirimichi Green	Warning	Control or burndown of weeds and grasses.
Oxadiazon-3	2%	Ronstar G	Warning	Used in shrub beds, tree circles, fence lines and other park areas for weed control. A primary liquid form pre-emergent product.
Pelargonic acid, related fatty acids	57% / 3%	Scythe	Warning	Minor use desiccant used for top-kill of early-stage, easily killed weeds.
Indiaziflam	7.40%	Specticle FLO	Warning	Pre-emergent weed control with the longest residual (up to 6 months) of any other pre-emergent herbicide
Triclopyr, Clopyralid	33% / 12.1%	Confront	Danger	Selective products for woody, difficult to control perennials, also for invasives and habitat restoration.

Fungicides				
Streptomyces lydicus WYEC 108	0.04%	Actinovate	Caution	A biological fungicide for the suppression of root rot and damping-off fungi and the suppression/control of foliar fungal pathogens
Thiabendazole hypophosphite	26.60%	Arbotec 20-S	Caution	Trunk injection product for certain high value elms.
Bacillus amyloliquefaciens strain D747	25%	DoubleNickel 55		OMRI a broad-spectrum preventative biofungicide for control or suppression of fungal and bacterial plant diseases.
Mefenoxam	22%	Subdue Maxx	Caution	A turfgrass disease control for Pythium blight.
Propiconazole	14.30%	Alamo	Warning	Trunk injection product for certain high value elms.
Etridiazole, Thiophanate-methyl	15% / 25%	Banrot 40 WP	Warning	A broad spectrum fungicide that will control root and stem rot diseases caused by Rhizoctonia, Phytophthora, Pythium, Fusarium, and Thielaviopsis.

Chlorothalonil	82.50%	Daconil	Danger	Controls various fungal diseases including anthracnose, leaf spots, blights, and rots on many different species of plants.
Insecticides				
Acephate	75%	Acephate WSP	Caution	Acephate is reserved for use in the treatment of severe infestations of aphids, leaf miners, caterpillars, sawflies, thrips, and the individual treatment of red imported fire ant mounds.
Indoxacarb	0.05%	Advion	Caution	Fire ant bait. It'll only effect the ants and eradicates them in 24-72 hours. It is an extremely safe product that protects patrons and pets from fire ants.
Azadirachtin	3%	Azatin XL	Caution	Neem tree extract used for insect growth regulating and anti-feeding effects. Typically not used, but retained for unusual, short term use where long term plant health is affected.

Steinernema feltiae, Steinernema carpocapsae and Heterorhabditis bacteriophora	N/A	Beneficial nematodes	N/A	Naturally occur in soil and are used to control soil pest insects and whenever larvae or grubs are present. Do not expose humans or animals to any health or environmental risks. Beneficial nematodes only attack soil dwelling insects and leave plants and earthworms alone.
Bacillus thuringiensis	10.31%	Bt - asst'd (BTI Briquets)	Caution	Used to control mosquito and fly larva in standing water primarily ponds, streams, and around retainage / drainage areas. Product is usually in the form of a briquette.
Spinosad	11.60%	Conserve		Typically not used, but retained for unusual, short term use where long term plant health is affected.
Deltamethrin	2%	DeltaGard	Caution	Low dose granules to control ants, armyworms, centipedes, chiggers, chinchbugs, cockroaches, field and mole crickets, beetles, scorpions, spiders, and ticks.

Deltamethrin	0.10%	DeltaGard G	Caution	Low dose granules to control ants, armyworms, centipedes, chiggers, chinchbugs, cockroaches, field and mole crickets, beetles, scorpions, spiders, and ticks.
Sugar, fiber, ash, protein, fat	42%/25%/14%/5% / .3%	Dry Molasses	N/A	Ant control.
Tetramethrin, Permethrin, Piperonyl butoxide	0.1% / 0.25% / 0.5%	Enforcer	Caution	Directed jet sprays used for individual wasp and hornet nest treatments posing health and safety threats to park users.
Peppermint oil, sodium lauryl sulfate	1.5% / .15%	Essentria Wasp and Hornet Spray	Caution	Wasps, hornets, yellow jackets, and spiders
(S)-Methoprene	0.50%	Extinguish	Caution	Bait used to control imported and native fire ants.
Bacillus thuringiensis subsp. galleriae, Strain SDS-502 fermentation solids, spores and insecticidal toxins	9.00%	GrubGone	Caution	All season control of grubs.
Petroleum based		Horticultural Oils		(Sun Spray, Dormant Oil) - Primarily used as "dormant oils" applied before bud break in the spring to control pests on fruit and shade trees. Dormant oils are very effective against the eggs of certain mites, aphids, and scale insects that overwinter on

				fruit and shade trees. A new generation of more highly refined horticultural oils also known as "all seasons spray oils" or "summer oils" can be safely used on many plants during the growing season.
Nosema Locustae	0.05%	Nolo Bait	N/A	Controls grasshoppers.
Lacewig flies	Bio-control agent	Lacewig flies	N/A	Feed on aphids.
Imidacloprid	75%	Lada 75WSP	Caution	Versatile insecticide registered to control over 50 insect pest including aphids, lacebugs, leaf beetles, and leafminers.
Ladybugs	Bio-control agent	Ladybugs	N/A	Feed on aphids.
Praying mantis	Bio-control agent	Praying mantis	N/A	Used to control beetles, flies, caterpillars, wasps, and other insects
Cinnamon oil, clove oil	40% / 10%	Pure Gro Bug Stop	N/A	Mites, whiteflies, aphids, scales, trips, weevils, leafminers.
Bifenthrin	7.90%	Talstar	Caution	Termite, ant, bees, and wasp control.
Fipronil	0.014%	Top Choice Fire Ant Bait	Caution	Primary purpose is to control imported fire ants in turf grass and landscape beds. Mole crickets, fleas, ticks, and nuisance ants are controlled for a limited time.

Cyfluthrin	11.80%	Tempo SC Ultra	Caution	Used against flying pests such as wasps and yellow jackets, crawling pests like ants and centipedes, as well as various beetles and moths.
Potassium salts of fatty acids	49%	M-Pede	Warning	General soft body insect control. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Potassium salts of fatty acids	49.52%	Safer Soap	Warning	OMRI General soft body insect control. Retained for short term use where long term plant health is affected.
Miscellaneous				
Water soluble blue dye		Blue Spray Pattern Dye	Caution	Color dye used for application to all types of turfgrasses to make spray patterns visible.
Ethylated seed oil; polyoxyalkylene fatty ester	100%	Hasten EA adjuvant	None	Surfactant used in solutions to enhance spray coverage and increase efficacy.
2-Hydroxy-1,2,3-Propanetricarboxylic Acid, Calcium Chloride	25% / 9%	Tri-Fol Acidifier and Buffering Agent	Caution	OMRI Organic acidulate and buffering agent for lowering the pH of spray water.
Blue colorant, proprietary proportions		Turf Trax Blue Dye	Caution	Color dye used for application to all types of turfgrasses to make spray patterns visible.

Trinexapac-ethyl	11.30%	Primo Maxx PGR	Caution	For managing growth, improving quality and stress tolerance, and edging of warm and cool season turfgrasses.
Alkylphenol ethoxylate, alcohol ethoxylate and tall oil fatty acid	90%	Activator 90	Warning	Low-foaming, non-ionic type spreader adjuvant. Provides quick wetting, more uniform distribution, and increases retention of spray by reducing surface tension on the spray droplets.
Polyether-Polymethylsiloxane-Copolymer and Polyether	100%	Syl-Coat	Warning	OMRI Nonionic silicone surfactant specifically designed to enhance the efficacy of pesticides. Particularly effective when used with water-soluble and post emergent herbicides by completely wetting leaf surface and increasing amount/rate of uptake. Most evident on broadleaf and woody brush species.

Alkylaryl polyethoxyethanol, free fatty acids	93%	Tradition 93 Non-Ionic Surfactant	Warning	A wetting agent that helps soils to quickly and evenly absorb water by breaking the water's surface tension, allowing water molecules to spread for greater and faster water penetration. As a wetting agent, nonionic surfactants are often mixed in with potting media to ensure easy water absorption into plant soil.
Dimethylpolysiloxane, Methylated silicon	7.7% / 2.3%	Fast Break Antifoamer / Defoamer	Warning	Used to provide effective, high performance foam control at very low concentrations under normal foaming situations in recirculating sprayers and in other high agitation equipment.
Polyethylene glycol mono ether	90%	R-11	Warning	
Silicic acid, sodium salt, sodium carbonate, silicon dioxide, proprietary compounds, polyethoxylate		Neutralize Tank Cleaner	Danger	A cleaning and rinsing agent used to remove pesticide residues from spray equipment. Proper cleaning of equipment helps to reduce exposure to products, avoid cross contamination of

				incompatible products, and prevents damage to rubber, plastic, and other soft sprayer parts.
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APPENDIX 3: City Urban Forestry Approved List

Areas of pest management: trees on streets, parks, other city property, and UF nursery operations.

Active Ingredient(s)	Concentration(s)	Product Name	Signal Word	Description
Herbicides				
Picloram	24.40%	Tordon K	Caution	Used to control weeds, unwanted brush and trees e.g. Chinese privet.
Isopropylamine salt of Imazapyr	27.7%	Polaris	Caution	Post-emergent management of grasses and broadleaf weeds and undesirable aquatic vegetation.
Fungicides				
Streptomyces lydicus WYEC 108	0.04%	Actinovate	Caution	A biological fungicide for the suppression of root rot and damping-off fungi and the suppression/control of foliar fungal pathogens
Thiabendazole hypophosphite	26.60%	Arbotec 20-S	Caution	Trunk injection product for certain high value elms.
Bacillus amyloliquifaciens strain D747	25%	DoubleNickel 55		OMRI a broad-spectrum preventative biofungicide for control or suppression of fungal and bacterial plant diseases.

Propiconazole	14.30%	Alamo	Warning	Trunk injection product for certain high value elms.
Etridiazole, Thiophanate-methyl	15% / 25%	Banrot 40 WP	Warning	A broad spectrum fungicide that will control root and stem rot diseases caused by Rhizoctonia, Phytophthora, Pythium, Fusarium, and Thielaviopsis.
Chlorothalonil	82.50%	Daconil	Danger	Controls various fungal diseases including anthracnose, leaf spots, blights, and rots on many different species of plants.
Insecticides				
Acephate	75%	Acephate WSP	Caution	Acephate is reserved for use in the treatment of severe infestations of aphids, leaf miners, caterpillars, sawflies, thrips, and the individual treatment of red imported fire ant mounds.
Azadirachtin	3%	Azatin XL	Caution	Neem tree extract used for insect growth regulating and anti-feeding effects. Typically not used, but retained for unusual, short term use where

				long term plant health is affected.
Steinernema feltiae, Steinernema carpocapsae and Heterorhabditis bacteriophora	N/A	Beneficial nematodes	N/A	Naturally occur in soil and are used to control soil pest insects and whenever larvae or grubs are present. Do not expose humans or animals to any health or environmental risks. Beneficial nematodes only attack soil dwelling insects and leave plants and earthworms alone.
Spinosad	11.60%	Conserve		Typically not used, but retained for unusual, short term use where long term plant health is affected.
Petroleum based		Horticultural Oils		(Sun Spray, Dormant Oil) - Spray oils primarily used as "dormant oils" applied before bud break in the spring to control pests on fruit and shade trees. Dormant oils are very effective against the eggs of certain mites, aphids, and scale insects that overwinter on fruit and shade trees. A new generation of more highly

				refined horticultural oils also known as" all seasons spray oils" or "summer oils" can be safely used on many plants during the growing season.
Lacewig flies	Bio-control agent	Lacewig flies	N/A	Feed on aphids.
Imidacloprid	75%	Lada 75WSP	Caution	Versatile insecticide registered to control over 50 insect pest including aphids, lacebugs, leaf beetles, and leafminers.
Ladybugs	Bio-control agent	Ladybugs	N/A	Feed on aphids.
Praying mantis	Bio-control agent	Praying mantis	N/A	Used to control beetles, flies, caterpillars, wasps, and other insects
Cinnamon oil, clove oil	40% / 10%	Pure Gro Bug Stop	N/A	Mites, whiteflies, aphids, scales, trips, weevils, leafminers.
Cyfluthrin	11.80%	Tempo SC Ultra	Caution	Used against flying pests such as wasps and yellow jackets, crawling pests like ants and centipedes, as well as various beetles and moths.
Trichogramma Wasp Eggs	Bio-control agent	Trichogramma Wasp Eggs	N/A	Controls plant / leaf damaging caterpillars and worms.
Emamectin benzoate	4%	Tree-age Injectable	Warning	Used as a systemic trunk injection to treat emerald ash borers.

Potassium salts of fatty acids	49%	M-Pede	Warning	General soft body insect control. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Potassium salts of fatty acids	49.52%	Safer Soap	Warning	OMRI General soft body insect control. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Miticides				
Bifenazate	22.60%	Floramite SC	Caution	Miticide as part of a carefully implemented plan to keep mites at non- injurious levels. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Tau-fluvalinate	22.30%	Mavrik	Caution	For control of various mites, worms, weevils, and beetles as well as whiteflies, ants, crickets, and chiggers.
Abamectin	2%	Avid	Warning	For control of leafminers and mites and suppression of aphids, whiteflies, and thrips on ornamental plants.

Miscellaneous				
Ethylated seed oil; polyoxyalkylene fatty ester	100%	Hasten EA adjuvant	None	Surfactant used in solutions to enhance spray coverage and increase efficacy.
2-Hydroxy-1,2,3-Propanetricarboxylic Acid, Calcium Chloride	25% / 9%	Tri-Fol Acidifier and Buffering Agent	Caution	OMRI Organic acidulate and buffering agent for lowering the pH of spray water.
Alkylphenol ethoxylate, alcohol ethoxylate and tall oil fatty acid	90%	Activator 90	Warning	Low-foaming, non-ionic type spreader adjuvant. Provides quick wetting, more uniform distribution, and increases retention of spray by reducing surface tension on the spray droplets.
Polyether-Polymethylsiloxane-Copolymer and Polyether	100%	Syl-Coat	Warning	OMRI Nonionic silicone surfactant specifically designed to enhance the efficacy of pesticides. Particularly effective when used with water-soluble and post emergent herbicides. Most evident on broadleaf and woody brush species.

Dimethylpolysiloxane, Methylated silicon	7.7% / 2.3%	Fast Break Antifoamer / Defoamer	Warning	Used to provide effective, high performance foam control at very low concentrations under normal foaming situations in recirculating sprayers and in other high agitation equipment.
Polyethylene glycol mono ether	90%	R-11	Warning	Specially formulated for increasing the efficacy of various agricultural chemicals. Designed for use where quick wetting and uniform coverage of a chemical on a target surface is required.
Silicic acid, sodium salt, sodium carbonate, silicon dioxide, proprietary compounds, polyethoxylate		Neutralize Tank Cleaner	Danger	A cleaning and rinsing agent used to remove pesticide residues from spray equipment. Proper cleaning of equipment helps to reduce exposure to products, avoid cross contamination of incompatible products, and prevents damage to rubber, plastic, and other soft sprayer parts.

APPENDIX 4: Natural Areas Approved List

Areas of pest management: natural area parks, designated preservation areas, undeveloped City property. Herbicides are only used in natural areas along soft surface trails, generally 12 inches on each side, to prevent vegetation encroachment. Trails surfaces must be maintained for the safety of trail users and to allow access to maintenance and public safety vehicles. Hard surface trails are maintained primarily by mechanical means such as edging. Herbicides may also be used in natural areas in response to a maintenance or safety concern/complaint. In these cases, all available natural, manually, and mechanical means will be explored first. The least toxic herbicide will be used to address the pest.

Active Ingredient(s) / concentrations	Concentration(s)	Product Name	Signal Word	Description
Herbicides				
Glufosinate ammonium	24.50%	Cheetah Pro	Caution	Control of undesirable plant vegetation, including emerged annual and perennial grass, sedge and broadleaf weeds.
Iron HEDTA (FeHEDTA)	26.52%	Fiesta	Caution	Controls broadleaf weeds, disease, moss, algae, and lichens in turf through iron toxicity. Not for application in temperatures greater than 85.
Triclopyr: 3,5,6-trichloro-2-pyridinyloxyacetic acid, butoxyethyl ester	61.60%	Garlon 4	Caution	Selective products for woody, difficult to control perennials, also for invasives and habitat restoration.
Acetic Acid	10.00%	Horticultural vinegar		Post emergent used to control unwanted plants.
Isopropylamine salt of Imazapyr	27.7%	Polaris	Caution	Post-emergent management of grasses and broadleaf weeds and undesirable aquatic vegetation.

Triclopyr	60.45%	Remedy Ultra	Caution	Selective products for woody, difficult to control perennials, also for invasives and habitat restoration.
Diquat dibromide	37.30%	Reward	Caution	Non-selective herbicide that manages weed problems in aquatic, ground maintenance, and landscaping areas.
Picloram	24.40%	Tordon K	Caution	Used to control weeds, unwanted brush and trees e.g. Chinese privet.
Alkylphenol ethoxylate, alcohol ethoxylate and tall oil fatty acid/Constituents		Activator 90	Warning	Surfactant used in solutions to enhance spray coverage and increase efficacy.
Ammonium Nonanoate	40.00%	Mirimichi Green	Warning	Control or burndown of weeds and grasses.
Pelargonic acid, related fatty acids	57% / 3%	Scythe	Warning	Minor use desiccant used for top-kill of early-stage, easily killed weeds.
Insecticides				
Acephate	75%	Acephate WSP	Caution	Acephate is reserved for use in the treatment of severe infestations of aphids, leaf miners, caterpillars, sawflies, thrips, and the individual treatment of red imported fire ant mounds.
Bacillus thuringiensis	10.31%	Bt - asst'd (BTI Briquets)	Caution	Used to control mosquito and fly larva in standing water primarily ponds, streams, and around retainage /

				drainage areas. Product is usually in the form of a briquette.
Sugar, fiber, ash, protein, fat	42%/25%/14%/5%/.3%	Dry Molasses	N/A	Ant control.
Tetramethrin, Permethrin, Piperonyl butoxide	0.1% / 0.25% / 0.5%	Enforcer	Caution	Directed jet sprays used for individual wasp and hornet nest treatments posing health and safety threats to park users.
Peppermint oil, sodium lauryl sulfate	1.5% / .15%	Essentria Wasp and Hornet Spray	Caution	Wasps, hornets, yellow jackets, and spiders
Petroleum based		Horticultural Oils		(Sun Spray, Dormant Oil) - Spray oils primarily used as "dormant oils" applied before bud break in the spring to control pests on fruit and shade trees. Dormant oils are very effective against the eggs of certain mites, aphids, and scale insects that overwinter on fruit and shade trees. A new generation of more highly refined horticultural oils also known as "all seasons spray oils" or "summer oils" can be safely used on many plants during the growing season.

APPENDIX 5: Maintenance Schedule and Pest Management Methods

City of Denton
CLASSIFICATION PLAN
TURFGRASS MAINTENANCE

MAINTENANCE TASK	Class AA	Class A	Class B	Class C	Class D
Mow, edge, and trim	2 times per week Mow at 1.5 – 2”, clippings not collected	36 mowing cycles per year every 7 days at 2.5-3”, clippings not collected. Leaves are shredded and returned to soil.	32 cycles per year every 7 days through the growing season. Mow at 2.5 – 3”, clippings not collected leaves are shredded and returned to soil.	5-7 mowing cycles. Mow at 4-6” clippings not collected. Leaves are shredded and returned to soil.	As needed to maintain an identified particular natural state or within City code
Fertilization	4-5 lbs of Nitrogen per 1000 sf per year	3 lbs Nitrogen per 1000 sf per year in 2 applications – In conjunction with Athletic field fertilization	3 lbs Nitrogen per 1000 sf per year in 2 applications – In conjunction with Athletic field fertilization	None	None
Irrigation	Minimum of 1” per week, repairs w/in 24 hours. Potential increase watering due to drought or ryegrass transition. Deep watering cycles recommended	Approximate 1” per week, repairs within 48 hours.	As needed or immediately after fertilization –Water Truck	None	None
Aerification	5 times per year in conjunction with fertilizer applications	As needed	As needed	None	None
Over-seed/sod	Over-seed Ryegrass on athletic fields Oct. 1 Sod during field renovations	Overseed all bare areas in turfgrass once during growing season.	As needed	None	None
Leaf Removal	Mow & mulch	Mow & mulch	Mow & Mulch	None	None

<p>Pesticide Management:</p> <ul style="list-style-type: none"> - Herbicide - Insecticide - Fungicide - Rodenticide 	<p>January, February, March Pre-emergent for summer grassy weeds. (Oxidiazon)</p> <p>Non selective herbicide on infield skinned surfaces and transition areas during the growing season</p> <p>Spot treat broadleaf and/or grassy weed infestations during from March until December</p> <p>May and August - Broadcast treatment for fire ants with Advion, Extinguish, or Award II, 1lb per acre. Spot treat for fire ants during the warm season.</p> <p>April - September Monitor and treat for pest infestations such as Grub Worms, Army Worms and other pesticides detrimental to plant health or public safety.</p>	<p>January, February, March Non-selective herbicide on dormant Bermuda</p> <p>Pre-emergent for summer grassy weeds (Barricade Dimension, Specticle, or Pendimethalin</p> <p>May and August - Broadcast treatment for fire ants with Advion, Extinguish, or Award II, 1lb per acre. Spot treat for fire ants during the warm season</p> <p>April – September Monitor and treat pest infestations such as Grub Worms, Army Worms and other pests that detrimental to plant health or public safety.</p> <p>August and September Pre-emergent for winter weeds by October 1.</p>	<p>January, February, March Non-selective herbicide on dormant Bermuda</p> <p>Pre-emergent for summer grassy weeds (Barricade Dimension, Specticle, or Pendimethalin</p> <p>May and August - Broadcast treatment for fire ants with Advion, Extinguish, or Award II, 1lb per acre. Spot treat for fire ants during the warm season</p> <p>April – September As need, dependent on location, pest and amount of infestation</p> <p>August and September Pre-emergent for winter weeds by October 1.</p>	<p>As needed to maintain an identified particular natural state or within City code.</p>	<p>As needed to maintain an identified particular natural state or within City code.</p>
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<p>Fertilizer & Aerification Program</p>	<p>February 15-0-5 with pre-emergent for control of summer weeds</p> <p>March A single application of fertilizer should take place. 1 lb of N per 1000sf. Aerification of turf should be done just prior to application of fertilizer</p> <p>May A single application of slow release fertilizer should take place Aerification of turf should be done just prior to application of fertilizer.</p> <p>July A single application of fertilizer should take place Aerification of turf should be done just prior to application of fertilizer.</p> <p>August, September A single application of slow release fertilizer should take place Aerification of turf should be done just prior to application of fertilizer.</p>	<p>April, May, June A single application of fertilizer should take place by mid-May. It should be applied at 1 pound of N per 1000 sf. Aerification of turf should be done just prior to application of fertilizer.</p> <p>July, August, September One application of fertilizer should take place during this period in mid-July. It should be applied at 1 pound of N per 1000 sf. Aerification of turf should be done just prior to application of fertilizer.</p>	<p>Treat as needed to prevent loss of turf</p>	<p>None</p>	<p>None</p>
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<p>Action Threshold</p>	<p>Practice physical and mechanical controls that promote good turf health practices, such as over-seeding, topdressing, aeration, etc.</p> <p>Other measures will be taken prior to infestations to prevent degradation of the aesthetics, to eliminate rapidly declining plant health, to eliminate negative impacts on athletic programs and/or a threat to the public (wasps, mosquitos, etc.)</p> <p>Chemical control such as spot treatments will be used when infestation presents negative environmental impacts, negative effects on infrastructure and assets, intolerable aesthetic impacts and is widespread, invasive, and affects the health and safety of the environment.</p>	<p>In some cases, pests can be tolerated and are only considered a nuisance.</p> <p>Measures may be taken when infestations are present and are detrimental to plant health and a threat to the public’s safety. Physical / mechanical means will be used first in controlling pests. Chemical control such as spot treatments will be used when infestation presents negative environmental impacts, negative effects on infrastructure and assets, intolerable aesthetic impacts and is widespread, invasive, and affects the health and safety of the environment. This primarily impacts active areas such as playgrounds, hard surface trails, and around public buildings.</p>	<p>In some cases, pests can be tolerated and are only considered a nuisance.</p> <p>Vegetation is critical for stream stabilization and is tolerated in specific locations.</p> <p>Measures may be taken when infestations are present and are detrimental to plant health and a threat to the public’s safety. Physical / mechanical means will be used first in controlling pests. Chemical control such as spot treatments will be used when infestation is widespread, invasive, presents negative effects on infrastructure, and affects the health and safety of the environment. This primarily impacts active areas such as playgrounds, hard surface trails, and around public buildings.</p>	<p>As needed to maintain an identified particular natural state or within City code.</p>	<p>Measures will be taken for vegetation encroachment on soft surface trails.</p>
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City of Denton
CLASSIFICATION PLAN
TREE / SHRUB MAINTENANCE

MAINTENANCE TASK	Class A	Class B	Class C	Class D
Tree Trimming	Remove low limbs as needed for safety & equipment access.	Only hazardous limbs as needed.	Only hazardous limbs as needed.	Only hazardous limbs as needed.
Shrub Trimming	Complete trim 5-7 times per year.	Complete trim 5 times per year.	Not performed	Not performed
Pesticide Program.	As needed to prevent loss of plant material.	As needed to prevent loss of plant material.	Not performed	Not performed
Fertilization	2 times/year	Not performed	Not performed	Not performed
Stump Removal	As needed when higher priority projects are completed.	As needed during winter.	As needed during winter.	Only hazardous trees as needed, others maintained for wildlife habitat.
Action Threshold	<p>Choosing proper plant material and practicing proper planting methods, fertilizing, mulching, etc.</p> <p>Other measures will be taken prior to infestations to prevent degradation of the aesthetics, rapidly declining plants, and/or hazardous situations to the public (wasps, mosquitos, etc.)</p>	<p>In some cases pests can be tolerated and is only considered a nuisance pest.</p> <p>Other measures will be taken prior to infestations to prevent degradation of the aesthetics, rapidly declining plants, and/or hazardous situations to the public (wasps, mosquitos, etc.)</p>	As needed to maintain an identified natural state or within City code.	None

Invasive woody species such as Running Bamboo *Phyllostachys aurea*, Privet *Ligustrum sinense*, and Nandina *Nandina deomestica* will be controlled when staff determines that the species impedes visibility within parks and poses a threat to the safety and welfare of park users and service workers. Invasive species may be removed in an effort to reclaim parkland for active use such as open fields, playgrounds, picnic areas, and trails. It may also be removed in efforts to improve the environmental quality and encourage the establishment of native plant species.

City of Denton
CLASSIFICATION PLAN
FLOWERBED/PLANTING MAINTENANCE

MAINTENANCE TASK	Class AA & A	Class B	Class C	Class D
Planting/Bed Preparation	2 changes per year, when color is present.	Not performed	Not performed	Not performed
Fertilization	At planting; Bi-monthly after planting when color is present	Not performed	Not performed	Not performed
Cultivation	2 times per year for color change outs	Not performed	Not performed	Not performed
Mulch	Apply every 18 months or as needed (not in color beds)	Apply every 18 months or as needed	Not performed	Not performed
Pest Management	Treat as needed to prevent loss of plant and degradation of appearance.	Treat as needed to prevent loss of plant material.	Not performed	Not performed
Action Threshold	<p>Choosing proper plant material and practicing proper planting methods, fertilizing, mulching, etc.</p> <p>Other measures will be taken prior to infestations to prevent degradation of the aesthetics, rapidly declining plants, and/or hazardous situations to the public (wasps, mosquitos, etc.)</p>	<p>Choosing proper plant material and practicing proper planting methods, fertilizing, mulching, etc.</p> <p>Other measures will be taken prior to infestations to prevent degradation of the aesthetics, rapidly declining plants, and/or hazardous situations to the public (wasps, mosquitos, etc.)</p>	Not Applicable	Not Applicable

Park Facility and Asset Maintenance – The following maintenance plan and schedule has minimal pesticide programming but is an integral component to a proactive approach in the prevention and reduction of insect and rodent pests. Proper maintenance helps to eliminate favorable environments for pests through cleanliness and inspections help in early detection / identification of pests prior to infestations reaching threshold levels.

City of Denton
CLASSIFICATION PLAN
LITTER MANAGEMENT

MAINTENANCE TASK	Class A	Class B	Class C	Class D
Pick up ground trash & litter; empty receptacles	Pick up trash and litter 5 days per week. All year Weekend trash route at more populated parks	Pick up trash, litter and other debris twice per week from April through October. From November through March, pick up trash in all conspicuous park areas once per week. All year Weekend trash route at more populated parks	Pick up trash, litter and debris from all conspicuous park areas weekly from April through October, monthly from November through March.	Remove illegal dumping as needed.

City of Denton
CLASSIFICATION PLAN
ROAD & PARKING LOT MAINTENANCE

MAINTENANCE TASK	Paved Lots	Unpaved Lots
Inspect	Weekly	Weekly
Repair	As needed depending upon severity.	As needed depending upon severity.
Sweep	2 times/year or as needed	
Edge	Per mowing schedule	Per mowing schedule
Weed Management	Apply pre-and post-emergent herbicides as needed to control unwanted vegetation growing in expansion cracks.	Apply post-emergent herbicides three times per year.
Crack Fill	As needed	
Seal Coat/Overlay	As needed	
Grade		As needed
Clean culverts and drain pipes	Monthly or as needed	Quarterly or as needed
Striping/markings and wheel stops	Repaint every 2 years	

City of Denton
Parks and Recreation Department
PARK CLASSIFICATION PLAN
PLAYGROUND MAINTENANCE

MAINTENANCE TASK	Class A & B
Initial Audit	New Installation
High frequency inspections	Weekly - Litter control, redistribute attenuating surfacing, free of vegetation and debris
Low Frequency inspections	6 times per year – loose or broken parts, component durability
Repair	As needed, immediately after receiving parts

City of Denton
Parks and Recreation Department
PARK CLASSIFICATION PLAN
PARK AMENITIES MAINTENANCE

MAINTENANCE TASK	Class A, B, C, D
Clean restrooms Restroom maintenance & repairs	Clean and restock daily Work order within 24 hours
Inspect Drinking Fountains	Weekly during season of use – Mar 15 – Nov 15
Clean shelters and Picnic Pavilions Pressure Wash	Weekly or clean when reserved for special events As needed
Vandalism/Graffiti	Address within 48 hours of notification earlier if inappropriate graffiti
Water Features Mechanical (Fountains) Natural (Ponds, Lakes)	Inspect weekly when in use. Inspect quarterly & maintain as needed.
Inspect and/or repair benches, tables, grills	Monthly or as needed
Inspect and/or repair park and directional/street signs	Quarterly or as needed
Inspect and/or repair fencing	Quarterly or as needed
Inspect and/or repair security & parking lot lighting	Monthly or as needed
Inspect and/or repair swimming pools	Daily or as needed during season Pre & Post season inspection of major repairs.
Inspect and/or repair neighborhood tennis nets, net covers, striping, and backboards.	Monthly or as needed
Inspect and/or repair traffic barriers (post & cable, bollards, gates, handrails)	Monthly or as needed
Inspect and/or repair bridges.	Quarterly or as needed
Inspect Hike & Bike / Rail Trail	Quarterly or as needed
Inspect and/or repair sidewalks	Quarterly or as needed
Creeks and drainage ditches	As needed

City of Denton
Parks and Recreation Department
PARK CLASSIFICATION PLAN
ATHLETIC FIELD MAINTENANCE

MAINTENANCE TASK	Class AA & A
<p>Baseball Field Annual Off-Season Maintenance</p> <p>Grounds Maintenance - League play, good quality, maintain safety standards Maintained - Restroom/Concessions</p> <p>Safety Check (lights, glass, fence, bleachers) Pitcher Mound Field Lights Evers, Denia, N Lakes, F. Moore Roberts Field & Mack Parking Lot Scoreboards</p> <p>Trades Maintenance Program Turf Irrigation Systems Parking lots Ballfield lights Bleachers Fences & Backstops Parking Lot Striping Restrooms & Concessions Scoreboards</p>	<p>-Once a year add clay or amendment if needed. -Till up clay area to break up hard spots. -Blade clay areas to proper grade. -Remove any silt build up along grass and fence lines. -Check outfield grass area for high and or low areas, and for large cracks, silt in material if needed.</p> <p>-As scheduled for games -Permanent cleaned daily Portable serviced bi-weekly. -2-3 times per week</p> <p>-As scheduled for games -Infield 30 foot-candles -Outfield 20 foot-candles -50/30 -As scheduled for games -Replace bulbs as needed.</p> <p>-Monthly inspections & repairs as needed. -Quarterly inspections -Monthly inspection & bulb replacement (if needed). -Quarterly inspections -Quarterly inspections -Yearly inspections -Plumbing, electrical and structural repairs as needed. -Annual off-season service or as needed</p>
<p>Softball Field Annual Off-Season Maintenance</p> <p>Grounds Maintenance - League play, good quality, maintain safety standards Maintained - Restroom/Concessions Safety Check (lights, glass, fence, bleachers) Pitcher Mound Lights</p>	<p>-Once a year add clay material if needed. -Till up clay area to break up hard spots. -Blade clay areas to proper grade. -Remove any silt build up along grass and fence lines. -Check outfield grass area for high and or low areas, and for large cracks, silt in material if needed.</p> <p>-As scheduled for games -Permanent cleaned daily - Portable serviced weekly -2-3 times per week</p> <p>-As scheduled for games -Infield 30 foot-candles</p>

<p>Denia, Evers & North Lakes Parking Lot Scoreboards</p> <p>Trades Maintenance Program Turf Irrigation Systems Drinking Fountains</p> <p>Parking lots Ballfield lights Bleachers Fences & Backstops Parking Lot Striping Restrooms & Concessions Scoreboards</p>	<p>-Outfield 20 foot-candles -As scheduled for games -Replace bulbs as needed</p> <p>-Monthly inspections -Quarterly inspections -Winterize November 15-March 15 -Quarterly inspections -Monthly inspection & bulb replacement (if needed). -Quarterly inspections -Quarterly inspections -Yearly inspections -Plumbing, electrical and structural repairs as needed. -Annual off-season service or as needed</p>
<p>Soccer/Football/Rugby Fields Grounds Maintenance - League play, good quality, maintain safety standards Maintained - Restroom/Concessions Safety Check (lights, glass, fence, bleachers) Lights Parking Lot</p> <p>Trades Maintenance Program Turf Irrigation Systems Parking lots Ballfield lights Bleachers Parking Lot Striping</p>	<p>-Line with paint weekly. -As scheduled for games -Permanent cleaned daily & portable serviced bi-weekly -2-3 times per week</p> <p>-20 foot-candles -As scheduled for games</p> <p>-Monthly inspections -Quarterly inspections -Monthly inspection & bulb replacement (if needed). -Quarterly inspections -Yearly inspections</p>

APPENDIX 6: Pesticide Spill Incident Report



City of Denton
Pesticide Spill Incident Report

WHO	Name: _____		Phone Number: _____	
	Pesticide Applicator License #: _____			
WHAT	Chemical(s): _____		Temperature: _____	
	Weather Condition: _____		Wind Direction: _____	
	Dilute: <input type="checkbox"/> Yes <input type="checkbox"/> No Ratio: _____		Concentrate: <input type="checkbox"/> Yes <input type="checkbox"/> No Ratio: _____	
WHEN	Date: _____		Time: _____	
HOW	Approximate amount released: _____		What caused the release? _____	
WHERE	Did spill enter drain or waterway? <input type="checkbox"/> Yes <input type="checkbox"/> No	Exact location of incident (street address) or park: _____		
	Approximate amount recovered: _____		Surface spilled on soil, asphalt etc.? _____	
RESPONSE	Was 911 called? <input type="checkbox"/> Yes <input type="checkbox"/> No	Who responded to the scene? (Dept./Agency/Personnel) _____		
OTHER	Are there any injuries or exposures? <input type="checkbox"/> Yes <input type="checkbox"/> No		Has an accident report been filled out? <input type="checkbox"/> Yes <input type="checkbox"/> No	
WITNESSES	Name: _____		Name: _____	
	Address: _____		Address: _____	
	Phone: _____		Phone: _____	
INJURIES or EXPOSURES	Name: _____		Name: _____	
	Address: _____		Address: _____	
	Phone: _____		Phone: _____	
INJURIES or EXPOSURES	Name: _____		Name: _____	
	Address: _____		Address: _____	
	Phone: _____		Phone: _____	
NARRATIVE	_____			

APPENDIX 7: Product Label and Safety Data Sheet

Labeling, provided by the manufacturer, gives additional information concerning the pesticide product. Labeling includes booklets, brochures, flyers and other information as distributed by the pesticide dealer or manufacturer. The Safety Data Sheet (SDS) is a document containing chemical hazard and safety handling information prepared in accordance with the requirements of the Occupational Safety and Health Administration (OSHA) standard. An SDS attached to the product becomes part of the label and must be followed.

Label

The label is the printed information on or attached to the pesticide container. It verifies EPA approval, offers information on proper medical treatment for poisoning and provides guidelines for correct application and use.

The label identifies the pesticide as general or restricted-use and lists specific sites for the intended applications. By law, a pesticide can only be applied to a site that is identified on the label, even though specific pests may not be indicated. A site can be a crop, animal or location the product is intended to protect. Everyone, including experienced applicators, should review the label prior to purchasing, mixing, applying, and storing or disposing of the pesticide or empty containers.

Pesticide Label Requirements

EPA and the Texas Department of Agriculture (TDA) require certain items be included on pesticide labels.

1. **Brand, trade or product name:** A single pesticide active ingredient may be marketed at the same time under several brand names. Brand or trade names are indicated on the front panel of the label and are used in advertisements.
2. **Ingredient statement:** Every pesticide product label must include the active and inert ingredients, including percentage by weight. Often, the chemical name of the active ingredient is stated. If an approved common name of the active ingredient exists, it may be listed and followed by a chemical name. The names of inert ingredients sometimes are not stated, but the label must indicate their percentage to the total contents.

Product Name	
Active Ingredient(s) %
Inert Ingredients %
Total: 100%
This product contains ____ lbs. of ____ per gallon.	

3. **Classification statement:** Pesticides are classified based on hazards, intended use and effect upon the environment. General-use pesticides are less likely to harm the user or environment when used according to the label and do not require a license to apply. Restricted-use pesticides have a greater potential to harm the environment or the applicator when not used as directed. Restricted Use Pesticides (RUPs) contain a label such as the example here. You must have a TDA applicator license to purchase and use restricted-use pesticides.

<p style="text-align: center;">RESTRICTED USE PESTICIDE Due to (insert reason) For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification.</p>

4. **Keep out of reach of children:** Every pesticide label must include this statement on the front panel. This warning must be heeded.
5. **Signal words and symbol:** These indicate the relative toxicity of the active ingredient to humans and should appear on the front panel of a label. The signal words, in order of increasing toxicity, are **caution**, **warning** and **danger**. **Danger** indicates highly toxic products. The word *poison* and the *skull and crossbones* symbol also are associated with products having the **danger** signal word.
6. **Manufacturer:** The name and address of the manufacturer, registrant or formulator who makes the product must be printed on the label. If the registrant's name appears on the label and the registrant is not the manufacturer, it must be qualified by appropriate wording such as "packed for...", "distributed by...", or "sold by..."
- a. **Registration number:** An EPA registration number is proof the label was approved by the U.S. Environmental Protection Agency.
 - b. **Establishment number:** An establishment number identifies the specific facility that produced the product.

EPA Registration No. _____ [Registrant Name] EPA Establishment No. _____ [City, State, Zip]
--

7. **Directions for use:** Instructions for applying the pesticide provide rate of application, site (crop, animal, location, etc.) it is intended to protect, pests controlled, mixing directions, when and where the material is to be applied, and necessary application equipment.
8. **Precautionary statements:** Guide the applicator in taking proper precautions to protect humans or animals that could be exposed. Sometimes listed under the heading "Hazards to Humans and Domestic Animals." This area will include information about how pesticides may enter the body and any protective clothing or equipment the applicator should use.
9. **First Aid:** First aid treatment guidelines are recommended in this statement in case of over-exposure. This information should be read before the product is used, and again in case of an emergency.
10. **Environmental hazards:** Special warning statements on the label cover hazards to the environment. Examples: "This product is highly toxic to bees," or "This product is highly toxic to fish," and "Do not allow drift to contact non-target plants or trees."
11. **Reentry statement:** Indicates how much time must pass before a person can enter a treated area without appropriate protective clothing.
12. **Storage and disposal statement:** Pesticide inventories should be stored securely, preferably under lock and key, and separate from food and feed supplies. Pesticides and empty containers must be disposed of according to TDA and EPA regulations.
13. **Net contents:** Identifies the amount or weight of pesticide in the container and should be displayed prominently on the front of the label.

APPENDIX 8: Emergency and Information Phone List

Fire, Ambulance, HAZMAT – Dial 911

For Medical Emergencies & Immediate Health Concerns:

- **City of Denton Emergency Management** – 940-349-8836
- **Texas Poison Center Network**- 24 hours call 1-800-222-1222
- **TCEQ** - Texas Commission on Environmental Quality 24 hour spill reporting 1-800-832-8224 <http://www.tceq.texas.gov/>

Informational Phone Numbers

- **PARD Grounds Maintenance Division** – 940-349-7464
- **Watershed Protection Department** – 940-349-7153
- **NPIC** - National Pesticide Information Center, 1-800-858-7378 <http://npic.orst.edu/> provides general information on pesticide products, including safety, health, environmental effects, clean up and disposal.
- **Texas Department of Agriculture**, 512-305-8907 <http://www.agr.state.tx.us/> provides information on pesticide products and registration, conducts pesticide use investigation, and applicator licensing and certification.

To Report Pesticide Exposures:

Texas Department of State Health services (DSHS) 512-458-7111

Provides confidential investigations, consults with health care providers and provides clean up and exposure prevention information.

APPENDIX 9: Glossary

Action level	The point at which control measures are necessary to prevent a pest population or its impact from exceeding the threshold.
Aeration	The provision of air to the soil.
Amphibian	Any of a class (Amphibia) of cold-blooded vertebrates (as frogs, toads, or salamanders) intermediate in many characters between fishes and reptiles and having gilled aquatic larvae and air breathing adults.
Anti-siphon	A device that prevents waste water from being drawn back into supply lines and possibly contaminating the water supply.
Applicator	A person applying a liquid or solid treatment to a landscape.
Ball moss	Grey to greenish epiphyte about 3" to 9" wide within the Central Texas region and has scaly, recurved, linear leaves 2" to 6" long.
Basal growth	Leaves or stems growing at the base of a stem or tree trunk.
Botanist	A biologist specializing in the study of plants.
Bioaccumulation	The accumulation of a substance, such as a toxic chemical, in various tissues of a living organism.
Backpack sprayer	A sprayer worn on the back.
Biofilter	An emission control device that uses microorganisms to destroy volatile organic compounds and hazardous air pollutants.
Bioswale	Landscape elements designed to remove silt and pollution from surface runoff water, usually 6 inches or deeper.
Boom sprayer	A large-scale sprayer associated with a truck or tractor.
Broadcast spray	A wide, circle shaped spray or spray pattern.
Broadleaf	Having relatively broad rather than needlelike or scale-like leaves.
Brood	Whitish rice grain like larvae and pupae found within a fire ant mound.
Buffer zone	A corridor of land that is 25 feet in width on the sides of a stream or other body of water.
Carbamate	A salt or an ester of carbamic acid, especially one used as an insecticide.
Cholinesterase	A family of enzymes that catalyze the hydrolysis of the neurotransmitter acetylcholine into choline and acetic acid , a reaction necessary to allow a cholinergic neuron to return to its resting state after activation.
Commercial applicator	Operates a business or is employed by a business that applies restricted-use or state-limited-use pesticides to the property of another person for hire or compensation.
Contaminate	Soil, stain, corrupt, or infect by contact or association.
Core aeration	Increasing air penetration of the soil by removing plugs of soil.
Decontamination	To make safe by eliminating poisonous or otherwise harmful substances, such as noxious chemicals or radioactive material.
Dike	Contains spills to a confined area.
Disease	Any abnormal condition in a plant that interferes with its vital physiological processes, caused by pathogenic microorganisms, parasites, unfavorable environmental, genetic, or nutritional factors, etc.
Dog off leash area	Designated fenced or unfenced areas where dogs are allowed to be off-leash.

Drainage	The natural or artificial removal of surface and sub-surface water from an area.
Drift	The movement of spray product from an area of application to any unintended site. Drift can occur in the form of droplets during application or as vapors after application. Caution must be taken at wind speeds of 10 MPH or more. Application is prohibited at wind speeds of 15 MPH or above. Read and follow the product label directions carefully for all products.
Ecosystem	A system formed by the interaction of a community of organisms with their physical environment.
Edging	Mechanical means to define borders.
Endangered species	An animal or plant species in danger of extinction throughout all or a significant portion of its range.
Epiphyte	A plant that attaches to a host plant merely for physical support. Derives its water and nutrients from the air through their leaves and stems.
Erosion	The process of weathering and transport of solids (sediment , soil , rock and other particles) in the natural environment or their source and deposits them elsewhere.
Fertilization	The process of making soil more productive for plant growth by the addition of organic material or fertilizer.
Fungicide	Chemical compounds or biological organisms used to kill or inhibit fungi or fungal spores.
Germinate	To begin to sprout or grow.
Grade	The degree of inclination of a slope, road, or other surface.
Grafting	Is a method of asexual plant propagation widely used in agriculture and horticulture where the tissues of one plant are encouraged to fuse with those of another plant.
Granular application	Product in the form of small particles that provides a slower release of ingredients, usually used in broadcast or drop applications.
Groundcover	Any plant that grows over an area of ground, used to provide protection from erosion and drought, and to improve its aesthetic appearance.
Herbicide	A chemical substance used to destroy or inhibit the growth of plants, especially weeds.
High water line	The highest possible water level that would be expected in a given body of water during a 5-year period.
Hilling	Is the technique in agriculture and horticulture of piling soil up around the base of a plant.
Hornet	A venomous insect about a $\frac{3}{4}$ " long and is black and white, with a white face.
Horticulturalist	Practices the science of plant cultivation including the process of preparing soil for the planting of seeds, tubers, or cuttings.
Host	The animal or plant on which or in which another organism lives.
Hydrocyanic acid	An aqueous solution of hydrogen cyanide HCN that is a poisonous weak acid and is used chiefly in fumigating and in organic synthesis.
Infiltration	To cause (as a liquid) to permeate something by penetrating its pores or interstices.
Insecticide	A chemical used to kill or reduce the presence of insects.

Insect	A class within the arthropods that have a chitinous exoskeleton , a three part body (head , thorax , and abdomen), three pairs of jointed legs , compound eyes, and two antennae.
Integrated Pest Management	A coordinated decision in making and determining the best recommended practice that uses the most appropriate pest control methods and strategies in an environmentally and economically sound manner to meet pest management objectives.
Invasive species	Introduced species that can thrive in areas beyond their natural range of dispersal.
Invertebrate	An animal without a backbone.
Irrigation	An artificial application of water to the soil.
Larvae	The newly hatched, wingless, often worm like form of many insects before metamorphosis.
Leachability	Ability to dissolve out soluble constituents from (ash, soil, etc.) by the action of percolating.
Listed specie	A species, subspecies, or distinct population segment that has been added to the Federal list of endangered and threatened wildlife and plants.
Liquid application	Used when the aboveground parts of plants require treatment to control pests. Some liquid formulations come packaged in their own sprayer, ready to use; no dilution is required.
Lobed leaf	Leaf having deeply indented margins.
Mammalian	Any of various warm-blooded vertebrate animals of the class Mammalia, including humans, characterized by a covering of hair on the skin and, in the female, milk producing mammary glands for nourishing the young.
Microbial	A minute life form; a microorganism, especially a bacterium that causes disease.
Miticide	A chemical composition that kills or reduces the presence of mites.
Mitigation	To moderate (a quality or condition) in force or intensity; alleviate.
Monoculture	The cultivation or growth of a single crop or organism especially on agricultural or forest land.
Natural area	A natural area is a physical and biological unit in as near a natural condition as possible, which exemplifies typical or unique vegetation and associated biotic, edaphic, geologic, and aquatic features. The unit is maintained in a natural condition by allowing physical and biological processes to operate, usually without direct human intervention.
Noncommercial applicator	Is required to be licensed but does not qualify as a commercial applicator.
Noncommercial political subdivision	An applicator employed by a political subdivision of the State of Texas or a federal agency operating in Texas.
Organophosphate	Poison insects and mammals primarily by phosphorylation of the acetylcholinesterase enzyme (ache) at nerve endings.
Over seeding	Spreading seed over established turf that has been prepared for restoration.
Overstory	Also called the canopy is made up of the very tallest trees that stand over the rest of the plants.
Panicle	Compound raceme or branched cluster of flowers.
Paper wasp	A venomous insect about a ¾" long, red to brown in color with a long, cylindrical abdomen.

Parasitoid	An organism that spends a significant portion of its life history attached to or within a single host organism, which it ultimately kills (and often consumes) in the process.
Personal Protective Equipment (PPE)	Includes all types of equipment used to increase individual safety while performing potentially hazardous tasks. Minimum PPE standard is a long sleeve shirt, long pants, and closed shoes with socks. This may also include safety glasses, hard hats, gloves, lab coats, respirators, or and equipment used to protect against injury or illness.
Pest	A plant, organism, pathogen, insect or other small animal harmful to humans, garden plants, turf, trees, etc.
Pesticide	Any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest.
Pesticide applicator license	Certification of a person to use a restricted or state limited-use pesticide or regulated herbicides.
Pheromone	Is a secreted or excreted chemical factor that triggers a social response in members of the same species.
Photodecomposition	Chemical breakdown caused by radiant energy.
Poison ivy	A loose shrub or woody stemmed, climbing or creeping vine. The leaf consists of three leaflets on long, oppositely placed stems (petioles) and can be 3" to 10" long. Margins of the leaflets may vary from being entirely smooth, slightly toothed or lobed. The leaves can be glossy or dull green.
Post emergent	A herbicide used to kill weeds after they have germinated.
Predators	An organism that lives by preying on other organisms.
Pre-emergent	Chemicals that prevent the germinating weeds from establishing in a lawn.
Prune	To cut off or remove dead or living parts or branches of (a plant, for example) to improve shape or growth.
Pupae	The non-feeding stage between the larva and adult in the metamorphosis of holometabolous insects, during which the larva typically undergoes complete transformation within a protective cocoon or hardened case.
Pyrethroid	A chemical class of active ingredients found in insecticides. Low toxicity to mammals and birds; dissolves poorly in water making it toxic to fish.
Quill	A hollow shaft or sleeve through which another independently rotating shaft may pass.
Recurved leaf	A leaf curved or bent backwards or downwards.
Red imported fire ant	Adults are red to dark brown and occur in five different forms: minor workers, about a 1/8" long; major workers, about a 1/4" long; winged males and females, each about a 1/3" long; and queens, about a 1/3" long.
Resistance	The capacity of an organism or a tissue to withstand the effects of a harmful environmental agent.
Restricted entry interval	The time after a pesticide application during which entry into the treated area is restricted.
Rhizome	A horizontal, usually underground stem that often sends out roots and shoots from its nodes.
Right of way	A strip of land that is granted, through an easement or other mechanism, for transportation purposes, such as for a walking path, driveway, rail line or highway.

Rinsate	A dilute mixture of a pesticide or pesticides with water, solvents, oils, commercial rinsing agents, or other substances, that is produced by or results from the cleaning of pesticide application equipment or pesticide containers.
Rodent	Any of various mammals of the order Rodentia, such as a mouse, rat, squirrel, or beaver, characterized by large incisors adapted for gnawing or nibbling.
Rodenticide	Pest control chemicals intended to kill or reduce the presence of rodents.
Rootstalk	A horizontal plant stem with shoots above and roots below serving as a reproductive structure.
Rootstock	A plant, and sometimes just the stump, which already has an established, healthy root system used for grafting a cutting or budding from another plant.
Runner	Slender creeping stem that puts forth roots from nodes spaced at intervals along its length.
Runoff	The occurrence of surplus liquid (as water) exceeding the limit or capacity.
Scion	A detached shoot or twig containing buds from a woody plant which is grafted onto the stock.
Smooth leaf	A leaf having an entire or lobed margin but is not toothed.
Social wasps	Live in nests that wasps construct and defend cooperatively. Ex. Paper wasps, yellow jackets, and hornets
Sodium laurel sulfate	Detergent and surfactant found in many personal care products. Ex. Soaps and shampoos.
Soil	Surface layers of sand, silt, clay, and organic material on the surface of the earth that support plants.
Solitary wasp	Do not build communal nests and consequently do not defend their nest.
Solubility	The amount of a substance that can be dissolved in a given amount of solvent.
Spill	Accidental or unintentional release of hazardous material.
Spot spraying	Targeted or direct pesticide application.
Strainer	A device used to separate liquids from solids.
Tank	Holds chemical mixtures.
Threatened species	An animal or plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
Threshold	A level of pest presence above which unacceptable amounts of negative plant health impacts, negative environmental impacts, negative effects on infrastructure and assets, intolerable aesthetic impacts, or undue safety risks are likely to occur.
Till	To prepare (land) for the raising of crops, as by plowing and harrowing; cultivate.
Toothed leaf	A leaf that is notched on the outer edge, or margin, of a leaf (serrate).
Top dressing	Material applied to a surface, as fertilizer on land or crops, or stones on a road.
Toxicity	The degree to which a substance is toxic, poisonous or harmful.
Triclopyr	A systemic, foliar herbicide in the pyridine group. It is used to control broadleaf weeds while leaving grasses and conifers unaffected.
Tunneling	Process in which an animal makes a hole or passageway underground, usually for shelter.
Turf	Surface layer of ground containing a mat of grass and grass roots.
Urban forestry	Management, establishment, and protection of trees and forests within cities, suburbs, or towns.

Weeds	Any plant that crowds out cultivated and native plants.
Wetland	A lowland area, such as a marsh or swamp that is saturated with moisture, especially when regarded as the natural habitat of wildlife.
Worker Protection Standard	Is a regulation from the U.S. Environmental Protection Agency (EPA) designed to limit worker's exposure to pesticides.
Vertebrate	A member of the subphylum Vertebrata, a primary division of the phylum Chordata that includes the fishes, amphibians, reptiles, birds, and mammals, all of which are characterized by a segmented spinal column and a distinct well differentiated head.
Vespid	Mostly social nest building wasps.
Yellow jackets	Have a shiny yellow and black striped abdomen and are typically a ½" long, workers, and a ¾" long, the queen.

APPENDIX 10: Revisions

Date	Page	Reason	Authorized By	Date Approved
03/02/2020	Complete document	Include peer review feedback	IPM Committee and City Council	