

1. Agenda

Documents: [11.18.15.PDF](#)

2. Approval Of October 7, 2015 Meeting Minutes

Documents: [TSE MEETING NOTES 10 7 15.PDF](#)

2.I. Pesticide Comments From The Public On October 7, 2015 Meeting

Documents: [PESTICIDE COMMENTS.PDF](#)

3. Communication Items: (No Public Comment Will Be Taken)

3.I. Seasonal Parking Restrictions

Documents: [RIVERTON SPRINGBROOK MEMO 11-13-15.PDF](#), [RIVERTON AND SPRINGBROOK SEASONAL PARKING GRAPHIC.PDF](#)

4. Committee Updates/Input Sought

4.I. Solar Farm Concept

Documents: [SOLAR PROPOSAL.PDF](#)

4.I.i. Solar

Documents: [SOLAR MEMO.PDF](#)

4.II. Pesticides Update

Documents: [PESTICIDE ORDINANCE.PDF](#)

4.II.i. Portland Protectors Proposed Ordinance

Documents: [PORTLAND PROTECTORS SUBMITTED ORDINANCE.PDF](#)

CITY OF PORTLAND, MAINE
The Transportation, Sustainability and Energy Committee

Transportation, Sustainability and Energy Committee

DATE: 11/18/2015
TIME: 5:00 PM
LOCATION: Room – Council Chambers
City Hall

AGENDA

1. Approval of October 7, 2015 Meeting Minutes
2. Communication Items: (No Public Comment will be taken)
 - A. Seasonal Parking Restrictions
3. Committee Updates/Input Sought:
 - A. Solar Farm Concept
 - B. Pesticides Update

Councilor David A. Marshall, Chair
Councilor Jon Hinck, Vice Chair
Councilors Justin Costa and Kevin Donoghue

CITY OF PORTLAND, MAINE

Standing Committee on Transportation, Sustainability and Energy

Councilor David Marshall (D2), Chair

Councilor Jon Hinck (A/L), Vice Chair

Councilor Kevin Donoghue (D1)

Councilor Justin Costa (D4)

July 15, 2015

Meeting Minutes

Attendees: Councilor David Marshall, Councilor Kevin Donoghue, Councilor Jon Hinck, Councilor Justin Costa, Danielle West- Chuhta, Kathi Earley, Justin Pellerin, Nancy Gallinaro, Ethan Owens, Adam Lee, Bruce Hyman, Melissa Graffam, Troy Moon, Jeff Tarling, Gene Pierotti, Ryan Scott John Perverada, Jon Jennings

1. Approval of July 15, 2015 Meeting Minutes

Motion made by Councilor Donoghue to approve meeting minutes with the amendments made by Councilor Hinck. Meeting minutes now show the following: *“Councilor Hinck also asked how much more assessments do we intend to do in Solid Waste? He also suggested adding South Portland as a resource because they don’t use a bag system. They use one truck to pick up both containers with lids. For better or worse they also report a lower recycling rate.”* Seconded by Councilor Costa. Motion Passed 4-0. (Page with meeting minutes amended attached)

2. A. Valley, A and Congress Streets On-street Parking

Request to change spaces that are not currently time-restricted to two-hour parking. This would allow for greater turnover for non-residents and still allow for patrons to frequent nearby businesses. Residents who obtain neighborhood parking stickers will be able to park as long as needed.

Committee took public comment.

Tim McNamara, President, St. John Valley Neighborhood Association- Some buildings do not have parking and rely on on-street parking. Maine Medical Center is a daily challenge for parking. Another problem is event parking in the area. Also, would like to see parking enforcement during all events until 9pm.

Councilor Donoghue asked why two-hour and not one-hour? John Perverada said that there will be a mix of both. John also mentioned that during Sea Dog games he has staff (parking enforcement) on overtime for parking.

Motion made by Councilor Hinck to approve parking changes. Seconded by Councilor Donoghue. Motion Passed 4-0.

2.B. Private Parking Lot Ordinance

Danielle West-Chuhta discussed some of the items that she researched in regards to private parking lots within the city. Three things come up while doing this. One; customers need to be notified that they are in private parking lots and that it is possible for their vehicle to be booted if they over stay their allotted time. These signs need to be in the parking lot and say that it is a private parking lot and not municipal. The sign needs to say the fee for the removal of the boot, so they know upfront. Second; when the boot is placed, they need to know who to contact for removal. The parking lot owner needs to keep records for three (3) years so if there are any complaints, they can be followed up on. Third; licensing and background checks are needed. Parking lot owners need proper insurance and have all employees receive a background check to make sure the customers are protected

Danielle did mention that she will need guidance from council in regards to what to charge for licenses. Currently tow operators are charged \$265 and valets are \$260 per location (public property).

Councilor Donoghue asked who's being licensed. Danielle responded that the private parking lot company/owner.

Dan McNutt from Unified Parking Properties spoke to the Committee members. Dan mentioned that he has had signage in the parking lots before some of the issues have been happening. (He brought in many different signs that he has in his lots.) Dan said that he currently has five (5) to eight (8) signs in each of his parking lots. Dan also mentioned that he has a mobile application that a person can add more time to their parking space from anywhere in the city. His lots do have a 20-minute grace period. Then the fees are 20 min- 59 minutes = \$40; 60-70 minutes = boot fees. They have a 98% success rate; 2% violation ratio.

Councilor Hinck asked how many complaints has Unified Parking received? Mr. McNutt said that they have had 8-9 complaints on Yelp, two (2) letters to the editor, and five (5) to the Better Business Bureau (has a good rating with them). Mr. McNutt said that they have photos and video of each violation. Councilor Hinck asked were the complaints "that people didn't know it wasn't a city lot"? Mr. McNutt said handfuls were. After that, he stepped up signage even more and still saw some say the same thing.

Councilor Hinck asked Mr. McNutt is the ordinance was workable for him. Mr. McNutt feels that they are complying at this point. Danielle also mentioned that Unified has been very open to working with the City on these changes.

Councilor Donoghue asked if get a receipt. Mr. McNutt said they pay and get a receipt that they leave on the dash of their vehicle. On the receipt it does state regulations.

Councilor Donoghue asked what is the City's booting fees? John Peverada said it is a scoff law, after three (3) or more tickets (past 10-days old) the vehicle gets a boot. The fee is \$50 plus the outstanding ticket fees.

Councilor Donoghue asked if the City has seen a change in our parking and Councilor Costa asked how many complaints does the city deal with. John Peverada replied no, the city has not seen any changes to our parking. In regards to the complaints, the city sees about the same as Unified.

Councilor Hinck wants to see more changes. He would recommend that the signs be more descriptive in wording, size and color. Feels the “P” with the blue circle is more commonly associated with a municipal lot. Danielle said that is the universal symbol used for public and private parking lots.

The Committee asked for the following changes: minimum of three (3) red signs no smaller than 48x30, with one at the entrance, exit and payment device; signage that parking lot is private and not municipal; vehicle can be booted for overtime parking; sign also needs to say the name, address and a 24-hour telephone number for the licensee and property owner; all signage will be reviewed and approved by the City Manager.

Motion made by Councilor Hinck to accept and forward to the City Council the City Code Chapter 28, Article VIII, as amended above. Seconded by Councilor Donoghue. Motion Passed 4-0.

3. A. Complete Streets Policy Implementation Update

Communication Item

3. B. Transportation Planning Initiatives Status Report

Communication Item

3. C. Stormwater Utility Sample Billing

Communication Item

3. D. Update on Polystyrene and Plastic/Paper Bag Ordinance

Communication Item

4. A. Pesticide

Troy Moon started the discussion by stating that the city has two Master License pesticide holders, Jeff Tarling and Gene Pierotti. In order to become a Master you need to take multiple classes and exams. Within Public Services we do use pesticides in spot applications. Areas that need more application would be the city’s golf course and athletic fields.

Ethan Owens, from the Recreation Department said that they maintain 47 municipal/school fields and 30 playgrounds. They do this work with one (1) Supervisor, four (4) permanent staff and some temporary staffing. Ethan mentioned they needed help with just the standard procedures. They do follow the state’s best practices for school grounds, slit fields, over seeding, weed and feed in the spring and use fertilizer when they can. They do spot treatments at

Payson Park for example, but follow the state's guidelines. Uses pesticides on the tennis courts otherwise the weeds make the cracks bigger.

Gene Pierotti, from the Golf Course said that the course is 204 acres; of that 142 acres are for golf. (5 acres of the "greens", 39 acres for tee areas and 98 acres of roughs) To keep the course up to par, they use different measures from mowing, fertilizing, pesticides and irrigation. The turf needs to be maintained as golfers can't play in weeds or dirt. Pesticides are an important part in keeping it green, but not using much. The city employee's two (2) full-time employees and many temporary staff to keep up the maintenance of the golf course. There is an Integrated Management Plan for the golf course. If the city is to maintain and be owners of a golf course we need to use pesticides.

Jeff Tarling, from the Public Services Department said that he takes a minimal approach when using pesticides. Can use fertilizer for weed control. It was also mentioned that in the past the Rose Circle at Deering Oaks Park had used the most pesticides to control weeds. A few years ago the city changed the types of roses and there is no chemical input at all now.

Adam Lee, from Corporation Counsel, said they are looking at the pesticide ordinance for city owned property. They are looking at the ordinance used by the Town of Ogunquit; and staff recommended not to include private property at this time due to seeing that Ogunquit is having issues at this time.

Councilor Hinck asked for the total inventory/quantities and the total monetary amount used and where within the city for the past three (3) years. Staff responded that they do not have that information, but could try. Staff also mentioned that they have a licensed contractor that sometimes does work for the city.

Gene Pierotti also told the Committee that he does not use Round-up. Gene and Troy told the Committee members that they would get his golf course plan.

The Committee took public comment:

Avery Yale Kamila, Portland Resident- Public comment attached to meeting minutes.

Maggie Podhausier, Portland Resident – Supports the Portland Protectors Ordinance. Treats her clay tennis court organically. Pesticides affect water supply. If there are economic concerns with landscapers; hopes they are willing to be opened minded and open to new methods.

Andy Jones, Former Portland Resident, works at Toxic Action Center- IN favor of restricting the use of pesticides. Only toxic that is voluntarily put in the environment.

Paul Schlein, Resident of Arrowsic – Public comment attached to meeting minutes

Cathy Ramsdell, Portland Resident, Friends of Casco Bay – Public comment attached to meeting minutes.

Priscilla Skerry, Portland Resident – Public comment attached to meeting minutes.

Donna Herczeg, Portland Resident – Public comment attached to meeting minutes.

Scott McClaine, Practicing Plant Care Provider – Follows IPM program. Talked about instances where communities didn't use pesticides and athletic fields were invested. It costs less to treat then to replace.

Jesse O'Brien, Portland Resident – Welcomes this discussion. Agrees with what some of the things that they say. Hard to grow with our soil; Bare soil keeps ahold of the chemicals. There are more organic products that are available now. There is also more information available to those who apply pesticides. Also a follow-up email was sent and is attached to the meeting minutes.

Devin Morrill, Lucas Tree Experts – Public comment attached to meeting minutes.

Mike Peaslee – Public comment attached to meeting minutes.

Paul Dridden, Portland Resident, co-founder Pesticide Watch – Supports the Portland Protectors ordinance and not the city's. Concern is private use not municipal. You go to the store and see tons of this stuff. Personal observation is it doesn't take much to be a master applicator and have a college student go do it.

Phil Roberts, Garden Center- Is licensed and the goal is to use the least and only when absolutely needed. Looks at using organic items when he can. Common sense using IPM.

Tobie Young – Public comment attached to meeting minutes.

Bob Maurais, Mainely Ticks – Residents worry about tick borne diseases. Majority are concerns are on people's property. Maintains a detailed log of start time, what chemicals, what they are targeting, weather and wind speed. His business can treat in Ogunquit since there are health and safety concerns. Only 1 ½ ounce is active chemical in 2-3 gallons of liquid. One tablespoon active ingredient.

David L., Go Green Company – Organic applicator. Does use organic materials in many area schools/colleges and it is cost efficient.

Richard Varney, Advantage Pest Control – Uses Integrated Pest Management. It is not east to achieve to the master level for a license. To make that comment is insulting and rather offensive. Should treat the professionals as an asset to help.

Sally Trice, Portland Resident – Public comment attached to meeting minutes.

John Thibeaden, Portland Resident – Likes the Portland Protectors ordinance. What he is hearing is that city employees need more resources to do their job. Organic can be used and it can be done. An opportunity for Portland to lead.

Jim Cohen, Portland Resident, Working on behalf of a number of landscapers – We all want a healthy city, healthy children, healthy community and people. Integrated Pest Management- use all other tools then use an application as a last resort at the right time; with the right amount. Want to think about invasive species. We need to look at quantities. Let's use as little as we can with the IPM and we are willing to work with the city on this. Also, see more material attached to the meeting minutes.

Meeting adjourned at 7:40pm.

Pesticide Talking points

Hello, my name is Avery Yale Kamila.

I'm a mom, a Portland homeowner and I hold a degree in environmental science. I have kept up with the research into the toxicity of synthetic pesticides during the past two decades.

However, I'm here today because of an incident that occurred in 2003. I was sitting in the front room of my parent's house and watched a man spray the perimeter of the Reiche elementary school with Roundup.

Then in 2012 when I was pregnant, I left my downtown home early one morning to walk to work and encountered a city contractor spraying Roundup around the Stone Street Playground.

Before the Roundup was dry, more than 50 elementary school children, their younger siblings and caregivers arrived in the park to wait for the school bus. Some even sat on the still wet Roundup.

(PAUSE - DEEP BREATH)

No child should ever be exposed to Roundup. Especially these children, many of whom come from low income homes and non-European backgrounds.

ORDINANCE

To help make our city safer for children, pollinators, pets and the bay, a group of citizens crafted the Portland Protectors ordinance

that does 3 key things.

1. It bans the use and sale of synthetic pesticides and fertilizers
2. It allows lawn care products permitted under federal organic regulations
3. It requires landscape professionals to obtain additional certification to ensure they understand soil science

More than 20 biz & org supporters. Close to 400 sigs from citizens

SCIENCE

The weight of scientific evidence points to the need for abundant caution when it comes to synthetic pesticides and fertilizers.

Portland's current lack of regulation in this area is reckless, considering what we know about synthetics and toxicity. In addition, the city's current Roundup program presents the risk of future legal liability and litigation expense. Recently the first lawsuit was filed on behalf of a worker who handled Roundup before being diagnosed with cancer.

OPPONENTS

The vast, vast majority of people I speak with agree these chemicals need further regulation. The very few opponents I encounter have a financial stake in pesticides, fertilizers or associated products and corporations.

The bottom line is that the weight of the scientific evidence shows these chemicals pose grave risks to all living things and the prudent course of action is to reduce exposure, employ the precautionary principle and severely restrict their use.

GOOD NEWS

The good news is that cities and towns across the country and around the world have begun to regulate and ban pesticides. Canada has been a leader in this area. Yesterday Montgomery County, Maryland passed a sweeping lawn care pesticide ban.

Banning and severely limiting synthetic pesticides is the way of the future. Portland has the chance to be a leader in this field by banning both the use and the sale of pesticides.

The Portland Protectors pesticide ordinance is sensible legislation targeting lawn and landscaping chemicals used for cosmetic and superficial reasons. I urge you to take action to bring this comprehensive pesticide ordinance before the full council.

Thank you.

Testimony at Portland City Council's Transportation, Sustainability & Energy Committee Meeting—October 7, 2015

Members of Portland City Council's Transportation, Sustainability & Energy Committee, I am Paul Schlein, and I reside in the Town of Arrowsic. I have many friends and relatives here in this wonderful city, and Portland was one of the main reasons my family and I moved to Maine almost 30 years ago. I am here in support of the pesticide ordinance you have before you. In the spirit of full disclosure, I was a member of the staff of the Maine Board of Pesticides Control for eight years. While I worked with many experts, I do not consider myself one, and am here today simply as a concerned citizen, and I am not representing anyone but myself. However, I will attempt to convey information to you that comes from experts.

Here are some things I would ask you to consider regarding the ordinance:

- Multiple tests over a seven-year period, conducted by the Maine Board of Pesticides Control (BPC) and Friends of Casco Bay (FOCB) have detected numerous pesticides, as well as fertilizer, in the surface waters and sediments of Casco Bay. The pesticides found are those used in many lawn care pesticides, including so-called weed 'n feed products, which combine pesticides and fertilizers. Levels of some of the pesticides exceed Aquatic Life Benchmarks and may already be harming aquatic organisms.
- The excellent YardScaping and BayScaping programs, started by the BPC and FOCB, as well as the creation of the YardScaping Gardens at Back Cove, were the direct result of concern over these test results. While these programs and gardens have educated many people in sustainable alternatives to pesticide and fertilizer use, it's clear that they have not been enough, since, according to the BPC, distribution of home use pesticides in Maine has increased almost eightfold since 1995. This includes lawn and tree care company applications.
- The US Geological Survey has found that pesticides occurred more frequently in urban streams than in agricultural areas, with detection in 99% of samples.
- In Canada, at least 171 municipalities and seven provinces have implemented some form of cosmetic pesticide policy, and the number of municipalities in the US taking similar actions is growing every day.
- The effectiveness of any ordinance depends on getting the word out to the public and professional community through a highly visible and focused education campaign and program.
- The heart of organic lawn care and landscaping is the same as that of organic agriculture: healthy, balanced soil, not dependent on pesticides and fertilizers to support plant life.
- Science only confirms the obvious: pesticides are toxic and do exactly what they are designed to do—kill whatever they come in contact with.
- Science can be a moving target, where new research often finds that pesticide levels previously considered "safe" or low-risk for human consumption can change to a much lower amount, as in the case of arsenic, and more recently, with the reclassification of glyphosate or Roundup, the most widely used pesticide in the world, once considered one of the lowest-risk pesticides, has now been classified as a probable carcinogen. Similarly, the herbicide 2,4-D, the third most-used pesticide, has also just been reclassified as a possible carcinogen.
- Scientific research can also be manipulated and controlled for one's own purposes and profit, as was the case with the tobacco industry, and as has just been revealed with glyphosate's creator, Monsanto, where the company evidently kept their own findings secret, which showed the significant human health effects of this pesticide.
- You don't have to be a pesticides toxicologist to figure all this out. What it all comes down to is common sense and the Precautionary Principle: when there's any doubt, even if something is not proven scientifically to the nth degree, don't do it. Plain and simple.

- While there are viable alternatives to pesticides in every area and for every reason they are used, there's one area that's a win-win situation—pesticides used for cosmetic or aesthetic purposes for lawns and landscaping. Using pesticides for that purpose is not even worth considering for a second, since there are clear and proven alternatives that still produce lawns comparable in quality to lawns treated with pesticides.
- Using his own lawn as an example, Northeast turf researcher, University of Connecticut agronomy professor Karl Guillard summarizes the current approach to lawn care that provides an environmentally sound, but still beautiful lawn: *"I advocate the 'Freedom Lawn' approach on my property—allowing a wide diversity of perennial grasses and other herbaceous plants to dominate the lawn. I believe this is better for the overall ecology of the lawn and supportive of a greater overall biodiversity on my land. I will mow at least once every two weeks at 4", sometimes once a week during very rapid growth periods, and return the clippings back into the lawn using a mulching mower. I never water my lawn and allow nature to take its course during dry periods. I overseed fescues (both fine and turf-type) and white clover into my yard, especially those areas that are thin due to poor tolerance of the existing species to low fertility, water stress, or shade. I only apply fertilizers to newly seeded areas. Once established, they rarely ever see a fertilizer again. Compared to some of my neighbors who choose a higher management approach to their lawn areas, my lawn is very comparable to theirs in quality and aesthetic appeal. I firmly believe that low-input lawns are not necessarily low-quality."*
- Related businesses are not negatively impacted by the passage of ordinances that restrict pesticide use. One well-documented example is Toronto, where a major pesticide ordinance was passed, and the number of lawn care companies actually increased. In Ogunquit, where that town's ordinance became effective at the beginning of this year, the Code Enforcement Officer reports that lawn/landcare professionals are not complaining, as they have successfully shifted their businesses to using alternative approaches for their customers.

In conclusion, whether it should be an individual's right to apply toxic substances to their own property for aesthetic purposes is one question, but whether this can be allowed knowing these poisons leave the boundaries of that property, flowing everywhere, putting the public health and the environment at risk, is an entirely different question—one that this committee and the City Council will need to decide.

Please keep Portland safe and healthy.

Thank you for your time and consideration.

For reference, I have given you copies of the following supporting documents:

- *Is Your Lawn Truly Green?* A research project I worked on while at the BPC.
- *Municipal bylaw to reduce cosmetic/non-essential pesticide use on household lawns—a policy implementation evaluation.* A research paper on the Toronto pesticide ordinance.
- *Green up Your Yard with Organic Land Care.* A presentation from the Northeast Organic Farming Association Organic Land Care Program.



Is Your Lawn Truly Green? *Sage Advice from Top Northeast Experts*

*by Paul Schlein
Maine YardScaping Partnership*

Concerns about environmental impact and effects on human health have brought the perfect, lush green lawn—an enduring symbol of American prosperity—into the spotlight. What it takes to create and maintain that lawn needs some scrutiny. A high-maintenance lawn can become dependent upon frequent pesticide, fertilizer, and water use to keep it “healthy” and looking green, and these potentially harmful substances may end up in our precious waterways, living rooms, and bodies.

CAN WE HAVE OUR LAWN AND A HEALTHY ENVIRONMENT?

Do we have to forego our lawns altogether to save ourselves and the planet? Probably not, if we are willing to rethink our idea of perfection. An attractive lawn *can* be grown without regular use of pesticides (weed, insect, or disease controls) and little or no added fertilizer. Researchers have been analyzing every facet of lawn production and maintenance to see what works and what doesn't. Old guidelines have been refined and new ones developed. Following these amended guidelines will help us to have truly “green” lawns that can significantly reduce the risks for our children, pets, and the environment.

The following information has been prepared with the help of four Northeast university turfgrass specialists*:

FERTILIZATION—REDUCED RATES OF NITROGEN ONLY, NO PORK (PHOSPHORUS OR POTASSIUM)!

Here's where critical new findings have come to light. When soils are adequate, only newly established and young lawns need fertilizer and, even then, only nitrogen—phosphorus and potassium are seldom needed, unless indicated by a soil test. The guideline of applying 2–4 pounds of nitrogen fertilizer per 1,000 square feet of lawn has been revised to one-quarter to one-half that amount. Basically, lawns need only one or two applications per year at half the labeled application rate.

Lawns 10 years and older store necessary nutrients and may never need fertilizer. Grass clippings are free fertilizer—if these are returned to the lawn with a mulching mower, chances are, additional fertilizer will not be needed.

When to Fertilize: Contrary to popular belief and common practice, spring is not the best time to fertilize a lawn. At that time, nitrogen will encourage top growth at the expense of roots and will promote germination of weed seeds. If and when fertilizer is applied, ideally it should be done

Allen, Sterling & Lothrop • Bar Mills Ecological • Carroll Associates, Landscape Architects • Casco Bay Estuary Partnership • City of Portland • Congress of Lake Associations • Friends of Casco Bay • Friends of Scarborough Marsh • Jacobs Edwards and Kelcey • Kennebunkport Conservation Commission • LakeSmart Program • Lisa Cowan, Landscape Architecture • Maine Board of Pesticides Control • Maine Department of Agriculture • Maine Department of Environmental Protection • Maine Landscape & Nursery Association • Maine Organic Farmers & Gardeners Association • Maine Soil & Water Conservation Districts • Maine State Planning Office • Maine Volunteer Lake Monitoring Program • Natural Resources Conservation Service • New England Organics • O'Donal's Nurseries • Portland Trails • Shaw Brothers Construction • Skillin's Greenhouses • Southern Maine Community College • Think Blue Maine Program • Town of Brunswick • University of Maine Cooperative Extension

only once or twice a year in late August or September. This approach provides fertilizer when the grass can best utilize it, not when it is likely to run off into waterways (always sweep fertilizer back onto the lawn from sidewalks and driveways). Fertilizer should never be applied to frozen or saturated soils, or in advance of expected heavy rain.

OVERSEEDING—KEEPS OUT WEEDS!

At the first sign of thinning or bare spots in the lawn, loosen the soil with a rake or similar tool and apply perennial ryegrass at a rate of about 7 seeds per square inch, with nitrogen fertilizer at one-third the labeled rate. Ryegrass will germinate quickly (7–10 days), before the weeds get a chance to invade. Do this every few weeks in early spring and late summer. Overseeding is also an inexpensive method for replacing high-maintenance grass varieties with lower ones (*see Choose Appropriate Grass Species, below*).

CHOOSE APPROPRIATE GRASS SPECIES—THEY WILL MAKE YOUR LIFE EASIER!

Many problems with lawns are due to inappropriate grass species. Popular species, including most Kentucky bluegrass varieties, have high fertilizer and water requirements, are not shade-tolerant, and are more susceptible to disease. To survive and maintain quality, these species need a high level of pesticides and fertilizer. This increases the likelihood of water quality problems due to runoff and leaching of nutrients or pesticides, *and that's what we are trying to avoid*.

On the other hand, turf-type tall fescues and fine-leaf fescues require less fertilizer and water and are more shade-tolerant. These are the “green” species we want on our lawns. In small amounts, perennial ryegrass, because of its quick growth rate, is perfect for overseeding bare spots, but, for the same reasons mentioned for Kentucky bluegrass, it is not as suitable for covering an entire lawn.

Whichever species are used, be sure they are endophyte-enhanced (insect-resistant—*see Pest Management, below*).

Diversity Is Best: The “freedom” or “climax” approach to lawns is advocated by some turfgrass specialists. These lawns include a wide diversity of perennial grasses and other herbaceous plants, including chamomile, yarrow, and especially black medic and Dutch white clover—plants that fix nitrogen and provide free fertilizer. Rethinking the perfect lawn may also require redefining what constitutes a weed. Clover, now considered a weed by many, used to be very popular for lawns until widespread use of herbicides began, but plants that provide free fertilizer should be celebrated.

MOW HIGH—WITH A SHARP BLADE

3" or more does the trick! It is well established that the higher the cut when mowing the lawn, the deeper and more extensive the root system. Deeper-rooted lawns recover more quickly from drought. Higher mowing heights leave a lawn with more resistance to water movement, therefore reducing runoff. Higher cut grasses can also tolerate a higher population of pests without significant damage. Last, and certainly not least, taller grass blades shade out weeds and reduce the number of seeds that germinate.

WATER WISELY AND INFREQUENTLY

In the Northeast, except for a few weeks in the summer, most lawns rarely need watering. The case can be made for never watering (*see, Final Words from an Expert, below*). Only if absolutely necessary, deeply soak the lawn once or twice a week with a total of 1" of water. Frequent, shallow watering encourages shallow root growth, thatch buildup, and increases the potential for pesticide and fertilizer runoff.

CORE AERATION

Thatch is a layer of dead and decomposing grass plants that forms above the soil. A thin thatch layer prevents weed invasion and reduces soil compaction. However, if thatch gets too thick (more than 1"), water runs off, taking fertilizers and pesticides with it. Heavy thatch also provides harborage for insects and diseases. On older, heavily fertilized lawns, the thatch should be reduced to 3/4"—1/2" by core aeration or by topdressing with 1/8" of

compost (look for a compost with less than 1% phosphorus). Similar to the action of earthworms, core aerators punch small holes in the lawn, allowing air and moisture to penetrate the soil, and bringing decomposers to the surface where they help break down the thatch.

MIND YOUR SOIL'S pH

If a soil test indicates the pH is below 6, or indicates a calcium or magnesium deficiency, consider applying lime. Liming helps release nutrients that are bound up in the soil.

PEST MANAGEMENT

Research has shown that there are effective means other than using traditional pesticides to minimize weeds, insect pests, and diseases in lawns. Keep in mind the concept of threshold: the mere presence of a few weeds or insects does not necessitate the application of a pesticide.

Weeds: Overseeding lawns to achieve maximum density is the most effective approach to weed management. Weeds take advantage of thin, less vigorous lawns.

Grass Species Diversity: The more grass varieties and herbaceous plants a lawn has, the healthier it will be. As in all horticulture, growing large numbers of a single species leaves plants more subject to disease or pest infestation.

Use Insect- and Disease-resistant Grasses: Endophyte-enhanced grass species harbor a beneficial fungus that produces alkaloid compounds. These alkaloids reduce disease and insect infestations, increase drought tolerance, and further reduce the need for fertilizer and pesticides. However, these grasses are not recommended for pasture areas.

Beneficial Nematodes: Grubs—the larva of certain insects, including Japanese beetles and European chafers—can be a major lawn problem. Even the most powerful pesticides are not fully effective. However, the use of beneficial or parasitic nematodes—microscopic, worm-like organisms that feed on grubs—has shown promise and presents less risk than insecticides. In fact, when applied properly, nematodes can be 95% effective in controlling grubs—and that's better than many chemical controls.

Nematodes are recommended for treating localized, high-priority lawn areas. Key to their effectiveness is to first identify the grub species and then match it with the right nematode species. Newly hatched grubs are targeted, usually in August to early September, when other susceptible organisms are not present. Different than using chemical controls, this biocontrol needs moisture and should be applied in the evening (*see For More Information to find out how to obtain nematodes*).

FINAL WORDS FROM AN EXPERT

In telling us how he cares for his own lawn, University of Connecticut agronomy professor Karl Guillard concisely summarizes the current approach to lawn care that will provide us with an environmentally sound but still beautiful lawn: *"I advocate the 'Freedom Lawn' approach on my property—allowing a wide diversity of perennial grasses and other herbaceous plants to dominate the lawn. I believe this is better for the overall ecology of the lawn and supportive of a greater overall biodiversity on my land. I will mow at least once every two weeks at 4", sometimes once a week during very rapid growth periods, and return the clippings back into the lawn using a mulching mower. I never water my lawn and allow nature to take its course during dry periods. I overseed fescues (both fine and turf-type) and white clover into my yard, especially those areas that are thin due to poor tolerance of the existing species to low fertility, water stress, or shade. I only apply fertilizers to newly seeded areas. Once established, they rarely ever see a fertilizer again. Compared to some of my neighbors who choose a higher management approach to their lawn areas, my lawn is very comparable to theirs in quality and aesthetic appeal. I firmly believe that low-input lawns are not necessarily low-quality."*

FOR MORE INFORMATION

- Maine YardScaping Partnership: www.yardscaping.org
- Lawn Care without Pesticides: www.gardening.cornell.edu/lawn/
- The Homeowners Lawn Care Water Quality Almanac: www.gardening.cornell.edu/lawn/almanac/index.html
- Fertilizer Calculator: www.cag.uconn.edu/ces/sustainability/fertcalc.html
- Insect Parasitic Nematodes for Turfgrass Pest Management: www.oardc.ohio-state.edu/nematodes/turfgrass_pest_management.htm
- Maine and on-line vendors of biocontrols: http://www.yardscaping.org/lawn/documents/local-online-vendors-biocontrols_5-08.pdf

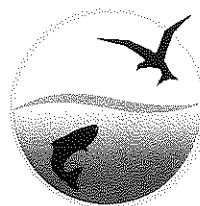
YardScaping hopes to inspire Maine people to create and maintain healthy landscapes through ecologically based practices that minimize reliance on water, fertilizer, and pesticides. The Maine YardScaping Partnership was formed out of the rising concern among statewide businesses, organizations, and agencies over the possible pollution caused by yard care chemicals washing away into water bodies, as well as the risks of pesticide exposure to people, pets, and wildlife.

**Jennifer Grant, A. Martin Petrovic, and Frank Rossi, at Cornell University, and Karl Guillard at the University of Connecticut.*

THE EXPERTS'

TURFGRASS TOP 10

- 1. Fertilize in Late August or September**
 - *Only if necessary and only on new or young lawns (less than 10 years old)*
- 2. Mow High**
 - *3" or more for vigorous roots and to shade out weeds*
- 3. Leave Clippings**
 - *They are high-quality, free fertilizer*
- 4. Plant Appropriate (Endophyte-enhanced) Grass Species**
 - *They require less water, fertilizer, and pesticides, and compete better with weeds*
- 5. Get Your Soil Tested**
 - *The only way to know just what the lawn needs is to do a soil test*
- 6. Keep Turf Cover Dense**
 - *Higher density means fewer weeds—overseed, overseed, overseed*
- 7. Core Aerate, Topdress, or Mulch Leaves**
 - *Reduces thatch, improves soil structure and releases nutrients into the soil*
- 8. Water Deep and Infrequently**
 - *Only if absolutely necessary, deeply soak the lawn once or twice a week with a total of 1" of water*
- 9. Keep Fertilizer and Clippings Off Sidewalks and Driveways**
 - *Prevents runoff of nutrients into our waterways*
- 10. Keep Mower Blades Sharp**
 - *A clean cut prevents disease*



Friends of Casco Bay

Casco BAYKEEPER

To: Portland Transportation, Sustainability & Energy Committee
Re: Portland Pesticide Ordinance

October 7, 2015

Good Evening,

I am Cathy Ramsdell, Casco Baykeeper Pro Tem, Executive Director of Friends of Casco Bay, and a resident of District 4.

I am here this evening to provide you with information about **pesticides coming in to Casco Bay and the effects of fertilizers and too much nitrogen on our coastal waters**. We have provided you with packets for you to review.

First, about **pesticides**:

Rainwater often moves pesticides from the locations on which they were applied originally, and washes these chemicals off the landscape and into our waterways. Friends of Casco Bay has tested for the presence of pesticides during rainstorms by sampling stormwater coming off neighborhoods and pouring out of pipes directly into Casco Bay. **We have detected a variety of pesticides in locations all around the Bay**, as you can see by this chart {see map of pesticide detections in stormwater running into the Bay}.

Pesticides are toxic by design. Many are known or suspected to be toxic to human health – not good for kids and dogs, and likely not good for a wide variety of marine organisms.

Pesticides do not belong in Casco Bay.

Second, about **fertilizers**:

We are concerned about the **impacts to the Bay from the nitrogen in fertilizers**.

Nitrogen is an essential nutrient for marine life, **but too much nitrogen can become a pollutant**. As nitrogen makes your lawn grow, so does it make marine plants grow. Excess nitrogen can trigger runaway growth of nuisance – even harmful – algae, a process known as eutrophication {see footprints photo}. As these algae blooms decay, the bacteria feeding on the decay take oxygen out of the water and release carbon dioxide; the increased carbon dioxide levels make our coastal waters more acidic. **Too much nitrogen resulting in increased carbon dioxide levels is the leading cause of coastal acidification**.

Coastal acidification is happening on top of ocean acidification. Oceans around the world have become 30% more acidic over the past two hundred years, as more and more carbon dioxide is released into the atmosphere, and a third of it is absorbed by marine waters.

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& Casco Baykeeper Pro Tem

Cathy L. Ramsdell, CPA, *Portland*

Our coastal waters here in Maine and Casco Bay are suffering a double whammy: ocean acidification coupled with coastal acidification from the increasing levels of nitrogen along the coast.

Acidification changes the chemistry of the water, inhibits shell growth in clams, mussels, oysters and other marine organisms, and is suspected as a cause of reproductive disorders in some fish.

Friends of Casco Bay has been sampling nitrogen in Casco Bay for years. Our data clearly show **nitrogen levels are higher closer to shore**, indicating that land-based sources are contributing the excess nitrogen to our waters – the result of human activities.

Nitrogen is coming into the Bay from **three sources** in almost equal proportion: **stormwater runoff containing fertilizers, sewage discharges, and the depositions of fossil fuel pollution from the atmosphere.**

We have been working hard over the years to limit nitrogen inputs. At the present time, it is difficult to limit the amount of nitrogen coming into the Bay from our sewage treatment plants – remember this accounts for about a third of the excess nitrogen coming into coastal waters. We are fortunate to have a couple of small sewage treatment facilities here in the Bay that are removing nitrogen before discharging, but most of the larger plants' upgrades for nitrogen removal will be expensive and will require more real estate. The good news is that Friends of Casco Bay worked diligently to obtain a federally designated No Discharge Area status for Casco Bay, and on days like today, when we've had 4 cruise ships in port, we are grateful that these vessels are not allowed to dump their sewage into the Bay – which would add not only bacteria, but also pulses of nitrogen into a marine system that cannot handle it.

Limiting or eliminating the use of fertilizers locally will lower the amount of nitrogen coming in to Casco Bay; this can help slow the devastating effects acidification and eutrophication are having on our marine resources.

Thank you for your time and your service to the City of Portland.

Respectfully submitted,

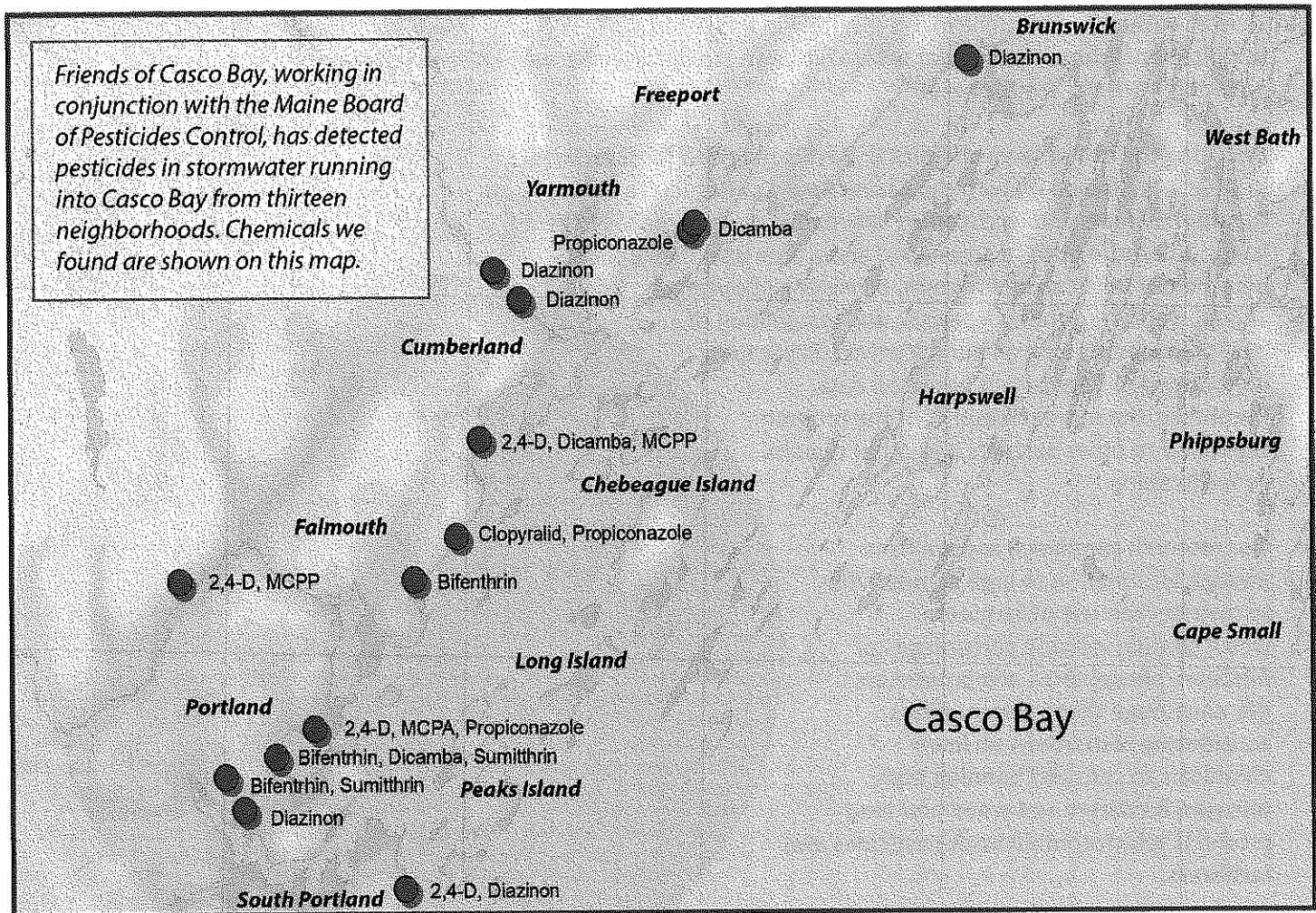
Cathy L Ramsdell
Executive Director and Casco Baykeeper *Pro Tem*, Friends of Casco Bay

clramsdell@cascobay.org
office (207) 799-8574
Cell (207) 838-1572



Friends of Casco Bay
Casco BAYKEEPER

What are our lawns doing to Casco Bay?



In the summer of 2005, Mike Doan, Research Associate at Friends of Casco Bay, opened an envelope and gasped. Before him appeared a table of laboratory numbers, the results of an analysis of a sample of stormwater Mike had collected a month earlier, from the end of a pipe in Back Cove. The readings for 2,4-D, a primary component in weed and feed products, were at the highest levels he'd seen yet in stormwater samples. This herbicide has been classified by the World Health Organization as a possible carcinogen.

Friends of Casco Bay has long been concerned about the possible impacts of lawn chemicals—toxic pesticides and chemical fertilizers—on the environmental health of Casco Bay. Our monitoring efforts reveal that the lawn chemicals you and your neighbors are putting on yards may well end up in the Bay.

Pesticides

Between 2001 and 2009, we collected rain water flowing into the Bay and analyzed the samples for a suite of pesticides. Our goal for this project was simply to determine "presence" or "absence" of pesticides. Lab results identified 7 different pesticides in 13 locations all around the Bay.

With this information we were able to state with confidence that pesticides were getting into our coastal waters. Determining the impacts of pesticides on our marine ecosystems has been beyond the scope of our work, but clearly, especially in regard to our iconic Maine lobster, more research needs to be done.

Fertilizers containing Nitrogen

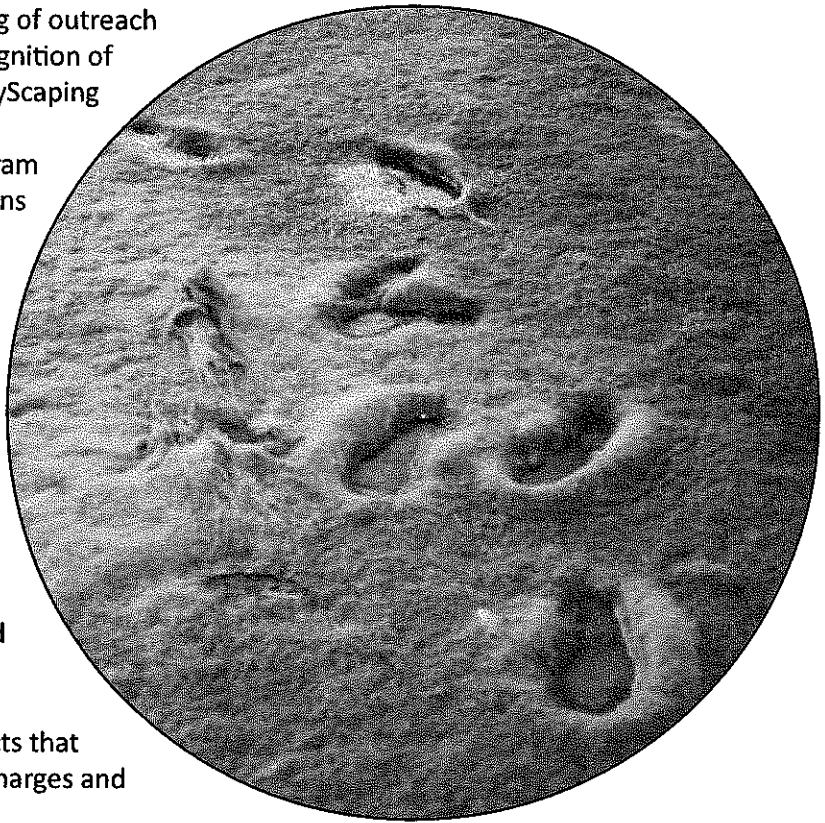
Friends of Casco Bay is concerned about the impacts of excess nitrogen—a component of fertilizers—in the marine environment. An overdose of nitrogen triggers runaway growth of nuisance, and even harmful, algae. As these plants decay, bacteria take oxygen out of the water and release carbon dioxide into our coastal waters. Too much nitrogen resulting in increasing carbon dioxide levels is the leading cause of coastal acidification. Primary sources of excess nitrogen are fertilizers, sewage discharges, and depositions of fossil fuel pollution from the atmosphere.

Reducing the use of lawn chemicals: BayScaping and local ordinances

In 1998, we teamed up with the Maine Board of Pesticides Control to offer residents and landscapers alternative ways to manage their lawns, to ensure both “a green yard and a blue Bay.” That effort became our **BayScaping Program**, consisting of outreach and education, scientific research, and recognition of best practices. As with all our initiatives, BayScaping is grounded in science and based on data. Eventually, the outreach aspect of the program expanded to other partners and other regions as Yardscaping.

Our research continues, and we have enough information to urge communities to restrict their use of fertilizers which contain variable percentages of nitrogen, phosphorus, and potassium. **We encourage those communities considering restrictions on lawn chemicals to consider banning high-nitrogen fertilizers and weed and feed products which contain both pesticides and fertilizers.**

We are also working on several other projects that reduce nitrogen pollution from sewage discharges and stormwater runoff.



These footprints show algae smothering a mudflat near Falmouth. This “rise of slime” is caused by nitrogen pollution in our coastal waters.



Friends of Casco Bay
Casco BAYKEEPER

Friends of Casco Bay's mission is to improve and protect the environmental health of Casco Bay. Home to the Casco **BAYKEEPER**®, we are a founding member of the international **WATERKEEPER**® ALLIANCE.

cascobay.org
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keeper@cascobay.org

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Melissa Graffam - Testimony, City Council, 10/7/2015

From: Priscilla Skerry <drskerry@myfairpoint.net>
To: <mag@portlandmaine.gov>
Date: 10/7/2015 11:59 PM
Subject: Testimony, City Council, 10/7/2015

Hi Melissa. Here is the copy of my testimony before the Transportation, Sustainability and Energy Committee tonight re: Pesticide Ordinance. Thank you for passing it on, and for your work tonight.

Dr.Skerry

October 7, 2015

To the City of Portland, Maine, Transportation, Sustainability and Energy Committee:

Councillors: David Marshall, Chair; John Hinck, Vice Chair,: Councilors Justin Costa and Kevin Donoghue:

Thank you for allowing this opportunity to speak in regard to the Synthetic Pesticide and Fertilizer Ordinance tonight in the City Hall Chamber. There is an imperative need for passage of this ordinance.

My name is Priscilla Skerry. I live at 95 Emery St. in Portland, Maine. I am a Naturopathic Doctor who has been practicing in the Portland and S. Portland areas for over 20 years now. I am here representing two groups, the Maine Assoc. of Naturopathic Doctors (MAND), and a group of over 70 concerned elders who have been meeting in Portland called the Elders for Future Generations.

According to the Cornell University Pesticide Safety Program (<http://pspp.cce.cornell.edu/Tutorials/core-tutorial/module04/index.aspx>), the toxicity of a chemical or pesticide is its **capacity to cause injury or poisoning to any living system**, be it human, animal, a lake, a forest...and I would add, an ocean.

Toxicity, according to the Cornell program, comes in two flavors. There is **acute** toxicity, where damage or death from exposure occurs within 24 hrs....and **chronic** toxicity, where death is observed after **continuous low level** exposure.

Cornell goes on to say that **a single acute exposure can be quite different from continual low dose exposures**. An example they give involves the pesticide, Cryolite. It's an aluminum sodium fluoride form of pesticide that is presently allowed to be sprayed on over 32 different fruit and vegetable crops...is heavily used on California crops, especially their grapes (think of the wine you consume). The Cornell tutorial goes on to say that during the rat studies, if a large amount of this pesticide is eaten at one time, **no** harmful effects will be observed in the rats...because it is a large molecule, not readily broken down and **quickly** passes through the gut to be eliminated. **However**, if rats are fed **small** amounts of Cryolite every day, they become ill and die. (Note that an animal study for a pesticide is generally no longer than 3-6 mos.)

The above statement is saying that **"the effects of both acute toxicity and chronic toxicity are dose-related"**; in the case of Cryolite, there is a larger effect from small doses over time. It is a "dose-time relationship".

Pesticide routes of entry: Pesticides can enter the body by mouth, skin or inhalation..... as when mixing and applying pesticides and herbicides bought off the shelf.

You can breathe them in, take them in orally from unwashed fingers, splash them on the skin, or, if you live in close proximity to where they are being applied, you can be exposed to "pesticide fall out". (Interestingly, skin in different areas of the body absorb pesticides at different rates. Exposure is often spread to these areas by unwashed fingers.)

Pesticides can cause local effects (rashes) or systemic effects (birth abnormalities); immediate or long term effects; reversible or irreversible effects.

You can have additive effects, where the effect of the use of two pesticides is equal to the sum of their toxicities (2+2=4)or synergistic effects, where the effect of their toxicity is more than their sum (2+2=5)

Too dangerous to test on humans, toxicity is determined through animal ...mice, dogs and many others. Toxicity is based on the lowest amount of a substance that will kill 50% or half the animals in the study...and is referred to as the LD50 (Lethal Dose 50) or LC50 (Lethal Concentration 50).

But the LD and LC50's do **not** tell us how the pesticide **acts** in the body, nor **how sensitive** different organs in the animal or human might be to it.

So the question becomes, how is acute and chronic toxicity to be dealt with by the medical profession, law makers and the public? Please note that we have entered the era of "chronic" disease, those of: Parkinson's, Alzheimer's, Diabetes, Obesity, Cardiovascular diseases and Cancer...most that have taken 10, 20, 30 years or more to manifest!

During the study of these diseases over the past years we've made huge scientific bio-technological advances and observations. The research is giving us clues... and, great warnings. Scientists are beginning to **see** how chronic diseases, such as those mentioned above, are related not only to our life style choices and diet, but to the explosion of use and persistence of chemicals in our environment.

Biochemically and physiologically our bodies follow a set of instructions derived from our DNA. These instructions are the individually unique set of blueprints encoded in our genes that were passed on from our parents, and from their's.

But what's going on? Our **genes** haven't changed in the 20 or 30 years we've been alive, but effects we call "epigenetic" **have** happened to them. As these blue prints exit from our DNA, they are being messed with by something(s). And it involves processes that have scientific names like: oxidation, acetylation, methylation.

What we're coming to understand is that these processes are **heavily** dependent, not only on our nutritional status, but by the chemicals we are being exposed to...especially, the pesticides and herbicides that have infiltrated our food system. Even more worrisome is the evidence appearing that is showing that these processes are being **passed on** to future generations by what is known as **genetic SNPS**, (single nucleotide polymorphisms). Literally, a consequence of rearrangement in our genomic alphabet.

We can't change the genes we were born with--at least, not yet--just as we cannot change the inherent toxicity of pesticides. But we **can** limit the possibility of poisoning ourselves **and** our future offspring "epigenetically" by preventing and/or limiting our exposure to them.

It is our wish that you develop a strong ordinance that would severely limit and/or prohibit their use...except in very special circumstances, and then, only by highly qualified experts properly credentialed in their safe use.

Thank you again for the opportunity to speak.

Priscilla Skerry, N.D. Resident:
 100 Brickhill Ave. Suite 304 95 Emery St.
 S.Portland, ME 04106 Portland, ME 04102
 (207) 772-5227

To: Portland City Councilors
Re: Attachments for consideration of banning lawn pesticides

I have included 5 attachments –
“Training for Municipal Officials or Landscapers on Organic Land Care Basics” by Chip Osbourne.

“What is Integrated Pest Management (IPM)?” Beyond Pesticides which includes the following statement “IPM is a term with many different definitions and methods of implementation. IPM can be interpreted to mean virtually anything the practitioner wants it to mean. Beware of chemical-dependent programs masquerading as IPM.”

Commercial Applicator Annual Summary Reports from 2013 – Trugreen and Lawn Dawg which apply chemicals in Portland. These reports are required by the State of Maine (MBOP) with which they are promptly filed alphabetically and unused to any purpose afterwards. According to the MBOP this report is actually more than required by Federal standards. If you review the report you can immediately see the shortcomings of using these in any investigative sense. They do not report where they are spraying, so you cannot determine how much is being applied for example, to Cumberland County, let alone specifically Portland. Also, the report allows for five ways of reporting Total Area Treated, by Acre, Sq. Ft. #trees, homes, pets which renders the report useless in trying to determine how much of an area is being treated. The lack of accountability by the industry, State and Federal officials should be an alarm to all who are trying to understand the severity of this problem and how much it is increasing.

In 2013 Trugreen applied 46,857,130 ^{sq ft} ~~acres~~ of Merit whose primary ingredient is Imidicloprid which is the insecticide Neonicotinoid. The MSDS sheet reports this as product as “Highly Toxic to aquatic invertebrates”. Recent research suggests that the use of this chemical and other insecticides may be contributing to honey bee colony collapse. In January 2013, the European Food Safety Authority stated that neonicotinoids pose an unacceptably high risk to bees, and that the industry sponsored science upon which regulatory agencies claims of safety have relied on may be flawed or even deceptive.

Also included is “Exclusive Golf Course is Organic” and Yale Press review of the book “Redesigning the American Lawn.

Thank you for your consideration of banning the use of pesticides in our Portland lawns to create a safer, healthier, and environmentally responsible city.

Donna Herczeg
173 Longfellow St.
Portland Maine

donnaph@maine.rr.com

Training for Municipal Officials or Landscapers on Organic Land Care Basics



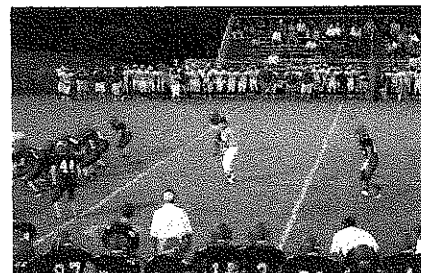
The National Coalition for Pesticide-Free Lawns is pleased to announce our **Organic Land Care Basic Training for Municipal Officials and Transitioning Landscapers**. This three-part training explains the Simple Steps to beginning an organic turf program and will cover the basic concepts, methods, and materials you need to get started. The training is geared toward school or park and recreation officials, however landscapers interested in transitioning are encouraged to attend.

The Program is taught by Chip Osborne, a professional horticulturist with over 30 years' experience and an expert on building and transitioning turf to organic care. He is accredited by the Northeast Organic Farming Association (NOFA) in organic land care, and has attended the University of Massachusetts Green School for turf management. He converted his retail greenhouse operation to an organic management plan, designed and constructed Marblehead's Living Lawn Demonstration site, and, as the elected Chairman of the Town of Marblehead, Recreation, Parks & Forestry Commission, is currently implementing an Organic Turf Management Plan for the town's public lands, including all athletic fields.



Chip lectures nationwide on natural turf management, both to homeowners and municipalities, and has addressed the National Sports Turf Managers Association.

The registration for the live training is closed, but if you would like to listen and watch the three recorded hour-long sessions we are offering them at a cost of only \$40 for municipal officials, and \$90 for professional landscapers. You will not have a question and answer session with the instructor, but you will be given instructions on emailing any questions on the material covered to the moderator. Register



We will also be sponsoring a technical workgroup proceeding the training to assist attendees in transitioning their landscapes.

If you need more information or have questions call Beyond Pesticides at (202) 543-5450 or email info@beyondpesticides.org.



BEYOND PESTICIDES

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info@beyondpesticides.org ■ www.beyondpesticides.org

What Is Integrated Pest Management (IPM)?

Integrated Pest Management (IPM) is a program of prevention, monitoring, and control that offers the opportunity to eliminate or drastically reduce the use of pesticides and minimize the toxicity of and exposure to any products that are used. IPM does this by utilizing a variety of methods and techniques, including cultural, biological, and structural strategies, to control a multitude of pest problems. IPM is a term with many different definitions and methods of implementation. IPM can be interpreted to mean virtually anything the practitioner wants it to mean. Beware of chemical-dependent programs masquerading as IPM.

Those who argue that IPM requires the ability to spray pesticides immediately after identifying a pest problem are not describing IPM. Conventional pest control tends to ignore the causes of pest infestations and instead rely on scheduled pesticide applications. Pesticides are often temporary fixes, ineffective over the long term. Least-toxic control products are a major growth area, and new materials and devices are increasingly available in the marketplace.

The Six IPM Program Essentials

- **Monitoring.** This includes regular site inspections and trapping to determine the infestation levels and types of pests at each site.
- **Record Keeping.** A record-keeping system is essential to establish trends and patterns in pest outbreaks. Information recorded at every inspection or treatment should include pest identification, population size, distribution, recommendations for future prevention, and complete information on the treatment action.
- **Action Levels.** Pests are difficult to completely eradicate. An action level is the population size that requires remedial action for human-health, economic, or aesthetic reasons.
- **Prevention.** Preventive measures must be incorporated into the existing structures and designs for new structures. Prevention is and should be the primary means of pest control in an IPM program.
- **Tactics Criteria.** Under IPM, chemicals should be used as a last resort only, but when used, the least-toxic materials should be chosen and applied to minimize exposure to humans and all non-target organisms.
- **Evaluation.** A regular evaluation program is essential to determine the success of the pest-management strategies.

Integrated Pest Management (as defined by Beyond Pesticides/NCAMP)

IPM is a pest-management system that

- (a) eliminates or mitigates economic and health damage caused by pests;
- (b) minimizes the use of pesticides and the risk to human health and the environment associated with pesticide applications; and
- (c) uses integrated methods, site- or pest inspections, pest-population monitoring, an evaluation of the need for pest control, and one or more pest-control methods, including sanitation, structural repairs, mechanical and living biological controls, other non-chemical methods, and, if these options are unreasonable and have been exhausted, least-toxic pesticides.

How to Implement an IPM Program

- **Decision-Making Process.** Create an IPM decision-making process that draws on accurate, timely information to make pest-prevention and management decisions. Determine the needs of the site and set “action thresholds,” i.e., levels of pest populations at which remedial action is necessary. This will vary depending on the site: what type of structure it is, who is using it, and how it is being used. For instance, a cafeteria will need a higher level of pest protection than an equipment room. This decision should be made with someone knowledgeable about the target pests and the risks of pesticides to be used, not someone who has a financial interest in selling a toxic pesticide product.
- **Monitoring.** Implement a monitoring program designed to provide accurate, timely information on pest activity, to establish whether there is in fact a pest problem, and to identify its causes. Implement a schedule and a plan for monitoring pest populations and the success of pest-control efforts. This will help determine acceptable pest-population levels, effective reduction measures, and breach of the action threshold. The best way to monitor for many pests, like cockroaches, is with sticky traps. They should be placed throughout the site at many different levels. Set the traps for 24 hours and then record your results. The traps should be used on a regular schedule.
- **Pest-Prevention Practices.** Use practices that eliminate the need for hazardous pesticides—changing the conditions to prevent problems, including occupant education, careful cleaning, pest-proof waste disposal, and structural maintenance. Know what conditions the pest requires: food, water, and habitat. Reduce or eliminate the sources of food and water. For instance, always clean up food and food areas; place food in airtight, sealed containers; dispose of food and food packaging in sealed garbage containers; repair leaky pipes and faucets; caulk up cracks and crevices; and eliminate clutter whenever possible. Remember that it can take some time for these methods to be effective.
- **Mechanical, Biological, and Least-Toxic Controls.** If all other methods have failed and monitoring shows that your pest population is still above your action thresholds, use mechanical methods, such as sticky traps, and biological controls like pheromones and parasitic insects. Then, and only then, should you consider spot treatment with least-toxic pesticides. You must weigh the risks associated with the use of a pesticide against the problems caused by the pest. Consider your options carefully, being mindful not to blindly jump at a solution that may have risks without first collecting the facts. If you must use a pesticide, you should choose the least-toxic pesticide available. Remember, all pesticides are poisons designed to kill; they should be handled carefully, with respect, and according to their labels.

Least-Toxic Pesticides (as defined by Beyond Pesticides/NCAMP)

Least-toxic pesticides include

- (a) boric acid and disodium octobrate tetrahydrate;
- (b) silica gels;
- (c) diatomaceous earth;
- (d) nonvolatile insect and rodent baits in tamper-resistant containers or for crack and crevice treatment only;
- (e) microbe-based pesticides;
- (f) pesticides made with essential oils (not including pyrethrums) without toxic synergists; and
- (g) materials for which the inert ingredients are nontoxic and disclosed.

The term “least-toxic pesticides” does not include a pesticide that

- (a) is determined by the EPA to be a possible, probable, or known carcinogen, mutagen, teratogen, reproductive toxin, developmental neurotoxin, endocrine disruptor, or immune-system toxin; or
- (b) is in EPA's toxicity category I or II. Nor does the term include any pesticide application using a broadcast spray, dust, tenting, fogging, or baseboard spray.

Report Year: 2013 Commercial Applicator Annual Summary Report

JAN 10 2014

Master Applicator's License Number	44844
Master Applicator's Name	IR SCOTT DESCOTEAUX
Company Name	TRUGREEN LAWN CARE
Address	ATTN: SCOTT DESCOTEAUX WESTBROOK, ME 04
Telephone #	(207) 854-5850

If this report covers applications performed by all company licensees, please check here. ☒

If no applications performed, please check box and return to the Board. ☐ Please convert all application data to pounds or gallons of "undiluted" pesticide applied.

Target Site	Pesticide Brand Name	EPA Registration Number	Total Pounds Undiluted Formulation	Total Gallons Undiluted Formulation	Total Area Treated (Ac, Sq Ft, #trees/homes/pets)
Golf Greens	Scott's Fungicide 6	538-159	373.75		183,931 Sq. Ft.
Broccoli	Phosphite AEC	548-412		7.1	57 Ac.
Wall Void	Empire 20	621-745		0.16	20 Homes
Dogs	Flies No More	624-467		3	1378 Dogs
Paper Machines	Quaticide	435-981		350	5 Machines
Turf	Cossock 0-0-7	70606-123-10434	172.5		714,000 Sq. Ft.
Turf	Merit 19-0-2	432-1344-10404	87.8		1,234,285.0 Sq. Ft.
Turf	Merit 0-0-7	432-1344-10404	22.5		321,280 Sq. Ft.
Turf	Merit 21-0-4	432-1344-10404	21.7		31,000,000 Sq. Ft.
Turf	Dimension 25-0-5	62715-542	29.61		119,760,000 Sq. Ft.
Turf	Batticide 25-0-5	100-1338-10404	44.8		45,760,000 Sq. Ft.
Flower Beds	Raz-off	228-366		9	400,789 Sq. Ft.
Turf	Escalade	228-442		60	140,151,950 Sq. Ft.
Turf	Sedgehammer	81440-1-10163			2.66 Ac.
Turf	Propanol 3	228-551		270	29,943,571.56 Sq. Ft.
Turf	Quincept	228-531		102.5	45,642,644 Sq. Ft.
Turf	Disinfect	279-3295		0.25	3,174,725 Sq. Ft.
Turf	Aquarium Extra	432-950		31	586,750 Sq. Ft.

197 4-15-1970

Total Pounds Undiluted Formulation	Total Gallons Undiluted Formulation	Total Area Treated (Ac, Sq Ft, #Trees/homes/pets)
5 WATER	15	141000000 714
7.9		1050000 50
	19	22529762
6.25		22464 39 Ft
	28	19367650 34
	82	38166503 5
	1.25	2663972

Report Year 2013

Commercial Applicator Annual Summary Report

MAR 03 2014

Master Applicator's License Number	41246
Master Applicator's Name	PATRICK L DEVOU
Company Name	THE LAWN DAWG
Address	c/o PATRICK DEVOU PORTLAND, ME 04101
Telephone #	(207) 878-6400

If this report covers applications performed by all company licensees, please check here. ☒

If no applications performed, please check box and return to the Board. ☐ Please convert all application data to pounds or gallons of "undiluted" pesticide applied

Target Site	Pesticide Brand Name	EPA Registration Number	Total Pounds Undiluted Formulation	Total Gallons Undiluted Formulation	Total Area Treated (Ac, Sq Ft, #trees/homes/pets)
Golf Greens	Scott's Fungicide 6	538-159	373.75		183,931 Sq. Ft.
Broccoli	Phosdrin 4EC	5481-412		7.1	57 Ac.
Wall Void	Empire 20	6217-145		0.16	20 Homes
Dogs	Fleas-No-More	624-467		3	1378 Dogs
Paper Machines	Quatcide	435-981		350	5 Machines
TURF	DYLOX	432-1308	3276 LBS		1486,000 sqft
	TRIPLET LOW ODOR	228-409		90 GAL	11,520,000 sqft
	SEEDGee Hammer	81800-1-10163	102		20,000 sqft
	17-0-4 WITH DITHIOPIR	53883-209-8725	469 LB		30,712,000 sqft
	21-0-7 WITH ALLECTUS	432-1349-961	1.5 LB		1,656,250 sqft
	24-0-4 WITH MAWAT	228-567-87245	9.1 LB		15,108,300 sqft
	17-0-5 WITH BIFENTHAU	53883-160-961	14.8 LB		5,362,500 sqft
	QUINCLORAC 75 DF	73220-15	32.5 LB		1,560,000 sqft
	BIFENTHAU 1%	53883-121-961	8.5 LB		2,843,000 sqft
TREES AND					
SHRUBS	DANOL	19713-123		20 GAL	870,000 sqft
	RANGER PRO	524-817		15 GAL	11,000 sqft
	SNAPSHOT	62719-175	400 LBS		200,000 sqft

The New York Times

GOLF

Exclusive Golf Course Is Organic, So Weeds Get In

By **BILL PENNINGTON** AUG. 16, 2010

EDGARTOWN, Mass. — Standing alongside the 13th green at the Vineyard Golf Club on Martha's Vineyard, Jeff Carlson spotted a small broadleaf weed between his feet. As the superintendent charged with maintaining the club grounds, he instinctively bent to pluck it, then stopped.

“We have a weed here or there,” he said unapologetically.

It was the rarest acknowledgment in American golf course landscaping — the Vineyard Golf Club is not meant to be as unnaturally perfect as many of the country's best-known courses.

Opened eight years ago, the club is thought to be the only completely organic golf course in the United States, its 18 holes groomed without the use of a single synthetic pesticide, fertilizer, herbicide or other artificial chemical treatment.

“When we started here, some of my peers thought this golf course would be a dust bowl,” Carlson said, walking across a lush, smooth green toward a rolling, verdant fairway. “I admit I wasn't so sure it could be done myself. People said we were crazy.”

The club has a more prominent endorsement now. The nation's first

golfer, President Obama, is expected to play here while vacationing this month, after playing the course twice last year.

With golf courses increasingly being criticized for environmentally unfriendly practices, the Vineyard Golf Club has become a petri dish for alternative maintenance techniques. Carlson has learned to kill weeds with boiling water and a natural foam cocktail and to remove moss with kitchen dish detergent, and he has transported microscopic worms from Iowa to attack turf-ruining grubs. He has disrupted the mating cycle of damaging oriental beetles with a strategically placed scent and has grown grass that he believes is more resistant to disease because it developed without chemicals.

The staff at the Vineyard Golf Club are now seen as environmental pioneers, with many in the golf industry examining their methods. The club's organic model could become the successful experiment that helps push thousands of courses toward using fewer pesticides, less water and more natural grass-growing procedures.

"Everyone won't be able to go fully organic, but we're proving you can severely cut back on synthetic chemicals," Carlson said.

When the Vineyard Golf Club opened, it was the first club in 30 years built on Martha's Vineyard, where the wealthy, many of them environmentally conscious but also accustomed to playing on chemically enhanced private courses, have long kept summer homes.

Opposition to the project on this liberal-leaning island was fierce. It helped the project that the land was also zoned for a 148-lot subdivision. The Martha's Vineyard Commission eventually allowed the course to be built with conditions prohibiting the use of any product whose active ingredient was synthetically produced.

Bill Wilcox, a water resource planner for the commission, called the club a good neighbor and said he knew of no major complaints against it.

Although the club is private, with 288 proprietary members — the initiation fee is \$350,000 with annual dues of \$12,000 — the deal with the commission includes a condition that 125 island residents be accepted as members with no initiation fee and annual dues of \$725.

Carlson, 61, had experience building a golf course with conservationists watching, having worked with the noted architect Michael Hurdzan during the 1990s in the creation of the Widow's Walk Golf Course in Scituate, Mass. That course is known as America's first environmental demonstration course, although it was maintained with some synthetic materials.

"Nobody had tried what we were trying," Carlson said.

Cruising the Martha's Vineyard club on a golf cart last week, Carlson recalled one of his earliest jobs in the business, in which he mixed mercury-based fungicides by hand, occasionally near the on-course house where he lived with his wife, Kathy.

"Kathy has beautiful, thick red hair, and it started to fall out," he said. "She went to the doctor, who did some tests and was told she had heavy-metal poisoning. Obviously, I stopped using that stuff. All these years later, it has been kind of satisfying to be trying something so very different."

In the golf community, there is no clear definition of what constitutes an organic course. A 79-page report prepared by a consortium of golf and environmental experts proposed definitions earlier this year but did not settle the issue. The report listed about two dozen courses that call themselves organic, but noted that most used some synthetic chemical pesticide, fertilizer or wetting agent.

"The Vineyard Golf Club has gone further than anyone organically, especially for that level of golf course and considering what they've achieved over the years," said Paul Parker, the chief author of the report.

When Vineyard Golf Club opened in 2002, Carlson was in hand-to-hand combat with fungal diseases, insects, grubs and the skunks, crows and raccoons that tore up the turf to get to the grubs. There was also the matter of teaching the membership that nothing in the rules of golf mandated that the game always be played on green grass.

“We had to promote the notion of playability rather than visual perfection,” Carlson said.

Still, the grubs were particularly vexing. A synthetic insecticide application would have made things easy. But Carlson discovered a specific kind of beneficial nematode, a roundworm that would attack the grubs from within the soil. It occasionally meant flying in the nematodes from Iowa packed in dry ice.

When it came to the skunks, crows and raccoons, the club went old school. It turned to a retired local fisherman — whom some have compared to Carl Spackler, the character played by Bill Murray in the golf movie “Caddyshack” — who was known on the island for his ability to trap and remove those creatures.

Nothing at the Vineyard Golf Club, now in its ninth season, is left to chance. To prevent fungal disease, crews go out daily at dawn using a long, whip-like device that whisks condensation off the grass throughout the course’s 69 acres. And visitors have their shoes cleaned before they play to keep contrary grass seeds or diseases from infiltrating the fairways and greens. The club’s maintenance labor budget is higher than those of most clubs its size, but Carlson said his net costs were the same “because of the money we save on traditional pesticides, which are very expensive.”

The Vineyard Golf Club greens are devoid of weeds or major blemishes, and they roll true and consistent. The fairways have patches of crabgrass and clover that are barely noticeable. What is most obvious in a walk of the holes is a striking and scenic layout pocked with deep, distinctive sod-faced bunkers

designed by the British architects Donald Steel and Tom Mackenzie.

"Yes, it is not perfect out there, but even if your ball comes to rest next to a shaved-down broadleaf weed, it's not going to affect your shot," said Gene Mulak, the club's golf pro.

Private golf course members are notoriously hard on superintendents, but Carlson says those at the Vineyard Golf Club are "real environmental pioneers because they put down the money for this experiment."

Sally Rorer, a charter member, said members were proud of the club's organic approach.

"It makes it easier to put a sandwich down on the ground between shots, too," she said.

What practices and techniques might be transferable from Martha's Vineyard, where golf courses are generally open only eight months a year, to other parts of the country is debatable.

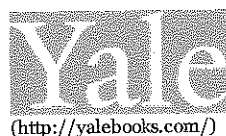
"Most golf courses wouldn't make it with an approach so organic, especially year after year with changeable weather," said James Snow, the national director of the United States Golf Association's Green Section. "But over time, we're going to be using less synthetics, and that's a good thing."

These days, walking past the occasional weed, Carlson has moved on to other goals.

"We're trying to be like any other golf course," he said. "I don't want people to come here and say, 'That was a real good golf course for an organic golf course.'"

"I hate hearing that."

A version of this article appears in print on August 17, 2010, on page A1 of the New York edition with the headline: Exclusive Golf Course Is Also Organic, So a Weed or Two Get In.



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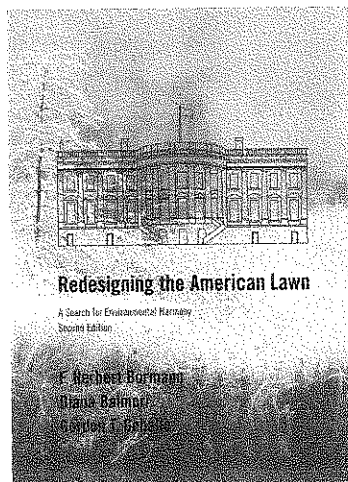
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F. Herbert Bormann, Diana Balmori, and Gordon T. Geballe

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"It's about time someone examined the effects—environmental, medical, and aesthetic—of our odd addiction to manicured greensward. The freedom lawn described herein is a great step forward; one hopes the authors will turn their attention to golf courses next."—Bill McKibben, author of *The End of Nature*

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"*Redesigning the American Lawn* . . . celebrates the lawn while detailing its impact on the environment. Rich with history, methodical in its analysis, and revelatory <!--sic--> in its simplicity, the trio makes a coherent case."—Joshua Mamis, *The New Haven Advocate*

"[The authors] suggest a number of strategies for beautiful yards that are less dangerous to the earth than those that pollute the air, threaten water and fossil fuel supplies, add unnecessary clippings to landfill sites, and threaten human and animal health with chemicals."—Mary Fran Cahill, *Milwaukee Journal*

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"Conventionally maintained lawns are sterile, unhealthy habitats that consume time and precious resources and poison watersheds. This classic book, updated and in a new format, provides an essential foundation for a new culture of conservation starting at home."—Frank Gill, Senior Vice-President for Science, National Audubon Society

"This completely revised and updated volume documents the progress of an alternative, environmentally friendly landscape design known as the freedom lawn. Profiles of individuals, businesses, and highway departments illustrate the successful implementation of the freedom lawn, which is free of pesticides and fertilizers, seldom mowed, and sustainable. The book also offers a lesson in the history of the industrial lawn and how we came to covet it."—*Science News*

"This edition of the 10-year-old landscaping classic contains updated text, new illustrations and a new chapter detailing the decade's progress."—*Toronto Globe and Mail*

"Richly illustrated with photographs, drawings, and cartoons, and written in simple, accessible language, the book is a wake-up call to homeowners and gardeners."—*American Studies International*

"*Redesigning the American Lawn* is a great guide to a new kind of environmentally sensitive landscape. For those of us who are gardeners or lawn enthusiasts, it makes clear that through our choices and our actions we can indeed practice the kind of individual stewardship increasingly needed to assure we leave this good earth a better place for our children."—William K. Reilly, Senior Fellow, World Wildlife Fund, Former Administrator, U.S. Environmental Protection Agency

TOP

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From: Jesse O'Brien <jobrien@downeastturf.com>
To: Troy Moon <thm@portlandmaine.gov>
Date: 10/8/2015 8:48 PM
Subject: Ordinance

Troy

I neglected to share some information Wednesday night. In discussing Portland's pesticide ordinance with the state horticulturist and UMaine extension horticulturist, there is no to include poison sumac or poison oak in the ordinance. Both plants are not in Maine. If they happen to hitch hike here for some reason they will soon die off. Poison Oak grows in arid areas, it's too humid in the northeast.

Jesse

Sent from my iPhone

Wednesday October 7th, 2015

Good Evening, My Name is Deven Morrill and I am here tonight representing Lucas Tree Experts. Lucas Tree Experts was founded in 1926 in Portland Maine. Over the past century we have grown to more than 500 employees, working from Nova Scotia to South Carolina. We currently operate two facility's, with in the city of Portland, one on Riverside Street and the other on Warren Ave. Our roots within this city run deep. We are proud to be a Maine based company who operates on both an international stage and a local level.

We are here tonight to oppose and share our concerns about the proposed Pesticide Ordinance as it is currently written. While we encourage this discussion and support the proposal's intent to apply only to municipally held land, the ordinance misses its mark.

We would like to suggest the following changes to the proposed ordinance:

- Section 4, subsection b i: States "utility, and other routine vegetation Maintenance Programs on Transmission sections that run through the city of Portland". We would recommend changing this Language to read "Utility, and other routine Maintenance programs, on Utility Rights of Way, that run through the city of Portland" This language clarifies the sites to which Integrated Vegetation Management Programs apply.
- In Section 4, B, IV (9), and X (10), it states that treatments for Dutch Elm Disease **BY** the City Arborist and Treatments for the control of invasive species that may be detrimental to the environment would be exempt from this ordinance. However, the City Arborist typically is not the one applying the product. As Arborists by trade, our team is always on the lookout for invasive insects. Emerald Ash Borer, Asian Long Horn beetle, Hemlock Wholly Adelgid, and Winter moth are just a few that are on our door step, or unfortunately, have made it to our area. We feel that applications, **AS DIRECTED** by the city arborist, would be a more appropriate description. In addition, all applications should follow of the principles of Integrated Pest Management, and therefore, be exempt from this ordinance.
- Finally, Section 4 subsection b v, vi, vii: These three subsections are the backbone of this ordinance. These subsections apply to golf courses, athletic fields, and city infrastructure, exempting all three by following the "Best Management Practices for the application or Turf Pesticides and Fertilizers" as set forth by the Maine Board of Pesticides Control. This exemption would apply to almost all sites currently being treated by the City of Portland. While we support the inclusion of this language in this regulation, we do not support it as an exemption to an outright ban on synthetic pesticide products. Instead, Best Management Practices should be the focus of this ordinance. If Best Management Practices are the high standard for our Sports Fields, golf courses, and city Infrastructure, they should be our focus on other city owned properties as well. The Board of Pesticides' Best Management Practices include the principles of an Integrated Pest Management program, and were developed and designed by the State, to aid in the reduction, elimination or treatment of pest problems on turf through a strategic approach using a variety of practices.

Our challenge to the City of Portland is this, be the first to implement an ordinance, that specifically follows, and adheres to, the Best Management Practices and the Integrated Pest Management programs

as set forth by the Maine Board of Pesticides Control. Details about these practices can be found on the Maine Board of Pesticides Control website. A more specific definition of Integrated Pest Management can be found in Chapter 27 of the Board of Pesticides Control rules, which also specifies that IPM must be followed on all school-owned properties by law.

It is important to remember that the goal of both the Best management practices and an integrated Pest management program is to reduce the use of products through a variety of methods.

In closing, we encourage the city of Portland to embrace Best Management Practices, implement an Integrated Pest Management Program, and pave the way to a Reduction in all products, synthetic or organic, through the education process.

Thank you for allowing Lucas Tree Experts the opportunity to speak tonight. I would be happy to answer any questions you might have.

Deven Morrill

October 7, 2015
City of Portland
Transportation & Sustainability Committee

Committee members;

Why pesticides:

How many people are actually aware of what a pesticide even is? Can you imagine that there are 11,294 products registered in Maine as pesticides. People think of pesticides as things like Round Up, Raid, D-Con and the list could go on and on of common household names of materials that are pesticides but it goes much deeper than that. Here's info from the US EPA, the federal agency designated with the responsibility of regulating pesticides:

A pesticide is a chemical used to prevent, destroy, or repel pests. Pests can be insects, mice and other animals, weeds, fungi, or microorganisms such as bacteria and viruses. Some examples of pests are termites causing damage to our homes, dandelions in the lawn, and fleas on our dogs and cats. Pesticides also are used to kill organisms that can cause diseases.

Most pesticides contain chemicals that can be harmful to people, animals, or the environment. For this reason the Office of Pesticide Programs of the Environmental Protection Agency regulates pesticides in the United States to protect public health and the environment.

Yes pesticides can be harmful, this is why they are already regulated at both the federal and state level by trained experts in this field. The EPA and the Maine Board of Pesticide Control have knowledgeable experts regarding things such as environmental effects and environmental fate of pesticides, they have toxicologist on their staffs that understand how pesticides can impact non-target organisms, they have food safety experts that understand how to regulate the use of pesticides to allow growers to help increase crop yields while at the same time assuring that the risk of any exposure to pesticides is within safe guidelines. Under the Food Quality Protection Act which was passed in 1996 all pesticides are evaluated based on a huge amounts of data that is required that looks at the over all potential risk of exposure to each pesticide from **ALL** uses (this includes agriculture, lawn uses, structural uses, over the counter uses, etc.) to assure that a safe threshold is established. From an EPA website: "In setting the tolerance, we must make a safety finding that the pesticide can be used with **"reasonable certainty of no harm."** These tolerances are set in conjunction with EPA, USDA, FDA based on numerous risk assessment studies. Under this act some pesticide uses were changed, restricted or all together eliminated to assure that the total **potential exposure** was below established thresholds based on scientific data. What is commonly referred to as the "risk cup" was reviewed and any possible exposure that exceeded what the cup could hold lead to reductions in allowed uses of specific products.

Further EPA goes on to explain what some common pesticide are:

Did you know that these common products are considered pesticides?

- Cleaners used to disinfect the kitchen floor.
- Cleaning products used to remove the mildew on bathroom tiles.
- Household plant sprays.
- Lawn and garden products to kill insects and weeds.
- Some swimming pool chemicals.

These are some common types of pesticides, and their purposes, used in and around our homes:
(15 categories)

Algicides	Control algae in swimming pools and water tanks.
Antimicrobials	Kill microorganisms (such as bacteria and viruses).
Attractants	Attractants are traps containing a pesticide and food to lure insects or rodents inside. However, food is not a pesticide even though it certainly attracts pests...like ants at a picnic.
Disinfectants and sanitizers	Kill disease-producing microorganisms in the kitchen and bathroom.
Fumigants	Produce gas or vapor intended to destroy pests in the house or in the ground.
Fungicides	Kill <u>fungi</u> (including <u>blights</u> , <u>mildews</u> , <u>molds</u> , and <u>rusts</u>).
Herbicides	Kill <u>weeds</u> .
Insecticides	Kill insects and other <u>arthropods</u> .
Miticides	Kill <u>mites</u> that feed on plants and animals.
Microbial pesticides	Microorganisms that kill or inhibit pests, including insects or other microorganisms. Sometimes microorganisms get rid of pests simply by growing larger in numbers, using up the pests' food supply, and invading the pests' environment.
Molluscicides	Kill snails and slugs.
Nematicides	Kill nematodes (microscopic, worm-like organisms that feed on plant roots).
Pheromones	Biochemicals used to disrupt the mating behavior of insects.
Repellents	Repel pests, including insects (such as mosquitoes) and birds.
Rodenticides	Control mice and other rodents.

(note directly from EPA website)

Pesticide include many many products that we all depend on every day to protect us from health risk, to sanitize our homes and businesses, to help reduce risk of illness, to minimize the risk of contracting diseases such as Lyme, West Nile, EEE, plague and new emerging diseases that are being identified on a regular basis. (Sadly we had a death last year in Maine from Powasson disease, a viral disease transmitted by ticks)

Over half a million people are treated annually in emergency rooms for insect stings and as many as 150 people die annually from stings.

20% of the world's food production is consumed or contaminated annually by rodents. Estimates are that without effective pest control practices which often include the use of pesticides this number could increase up to 50%.

Rodents also carry and spread fleas and ticks which we all know can spread devastating diseases, they are also often implicated in fires of "unknown origin" from chewing on wires.

Cockroaches in housing and schools are known to contribute to children's asthma. One study of inner city children in Atlanta indicated that 44% of children with runny noses and chronic wheezing had allergies to cockroaches. Roach allergies are reported to be the 3rd most common contributor to childhood asthma. This is relevant because in large infestations in Maine I have seen German Roaches, the species referred to in these studies outdoors in Maine)

Pesticides used in structural pest control protect what is most people's largest financial investment, their homes from being damaged by insects and rodents. Many of these applications are made outside to prevent pest from entering and also reducing human exposure to the materials as less or often none has to be applied inside. The principals of structural IPM indicate to use the least amount of material which is always best and it clearly is best to keep the pest out, rather than waiting for them to get inside where human exposure is greatest.

The proper use pesticides play an important in role in protecting our health and property. Any possible restrictions on there uses needs to be carefully and diligently studied, researched and very carefully considered.

The ordinance proposed by Portland Protector's has several areas that I believe raise serious concerns:

1. Not all "organic products are OMRI Certified" OMRI is a private company and not all pesticide manufacturers submit their products to OMRI for review.
2. There are pesticides that are "reduced risk pesticides" registered by EPA that may actually be less of an environmental concern than "organic" products. Again, organic does not = safe.
3. EPA assigns a signal word to a pesticide (Caution, Warning, Danger) based on toxicity and risk, there are newer pesticides that are such low risk they are not required to carry a signal word. In many cases these reduced risk materials may pose less hazard than an organic option which frequently requires larger quantities and more frequent applications. Why wouldn't these reduced risk products be permitted? (Note; these are NOT 25B exempted products)
4. Commercial Pesticide Applicators must be certified in "organic lawn management", are you aware that there are 24 different categories of "commercial applicators" in Maine Board of Pesticide regulations and many of these have no relevance to "land care management" Why does a licensed applicator treating for termites with a bait need to have this additional license? What justification is there for an additional license for an applicator applying material to control bedbugs, cockroaches, rats and mice.
5. Emergency Waiver-what if an emergency situation arises that requires a non-exempt application such as a bald faced hornets' nest that is located near an area where people are at risk of being stung , where it would not be prudent due to health concerns to wait to provide the required notification?

Organic pesticides are not available or effective for all pest that might be encountered in the City of Portland. They often require more material, more applications and a higher cost. In a perfect world cost should not matter but unfortunately we do not live in a perfect world. Every time the cost of a service

goes up an unintended consequence is that often people choose to try the DIY solution rather than paying the licensed professional. While this proposed ordinance would impact everyone, who really controls what the property owner is going to do on their own property. I contend that restricting the materials available for licensed professionals increases the risk of the untrained homeowner doing it themselves and causing much greater risk than a licensed, insured professional would ever do. Over applications, mixing at higher than label rates, exposure to none targets including children and pets, etc. are a much greater risk with an untrained and unskilled homeowner and can cause unintended harm.

While I believe the proposed ordinance(s) are well intended any restrictions on pesticide use can have serious unintended consequences. I urge the committee to be very cautious with these proposed ordinances, to reach out to experts in the relevant fields for guidance and to not act in haste or based on emotions.

As a Structural Pest Management Professional for over 37 years with licenses in several New England states as well as being an Associate Certified Entomologist I feel that I am well qualified to speak on this subject and would be happy to offer my expertise to the committee going forward as this subject is discussed further.

Respectfully,

A handwritten signature in black ink, appearing to read "Mike Peaslee", written over a horizontal line.

Mike Peaslee
Technical Manager
Modern Pest Services
100 Pleasant Street
Brunswick, Maine 04011
207-607-5017

Organic vs. Synthetic Fertilizer

Toby S. Young

Class A, Golf Course Superintendent - Val Halla Golf Course
President, Maine Golf Course Superintendents Association
BPC Licensed Commercial Master Applicator

As the general population becomes more aware of the environmental impact, golf course facilities have followed suit by improving environmental stewardship. Of the greatest concern is the impact that golf courses have on fresh water and marine resources. With these concerns, there has been a major focus on the types of fertilizers used on golf courses (ie: organic vs. synthetic) and whether or not one of these fertilizer sources is 'better' for the environment. Unfortunately, a variety of misconceptions have become prevalent due to popular media and opinion. The biggest misconception is that synthetic fertilizers are somehow different or worse than organic fertilizers in terms of environmental impact. For the purpose of this public comment, please consider nitrogen and phosphorus the 'offending' nutrients that impact freshwater and marine resources, respectively.

First consider nitrogen. Nitrogen is nitrogen is nitrogen, that is, whether it is applied as an organic fertilizer (e.g. manure) or a synthetic fertilizer (e.g. urea) when it reaches the soil, is taken up by the plant, or is leached into water, it exists as either NH_4^+ (ammonium) or NO_3^- (nitrate). There is absolutely no difference in the nitrogen form once it reaches the soil. You may have noticed that urea was listed as a synthetic fertilizer. But isn't it urea a component of urine? Yes, it is. It is an organic compound that can be and is synthesized commercially; therefore it is classified as a synthetic fertilizer.

Once in the soil, organic and synthetic nitrogen has an equal opportunity to leach. Opponents of synthetic fertilizers claim that they release too quickly, therefore increasing the potential for run off. This is simply not true. In fact, there are many long chain urea compounds that have a much more gradual, controlled release rate than organic fertilizers. Furthermore, heavy applications of synthetic fertilizers that have rapid release rates (and would have a high probability of leaching) would cause undesirable growth of turfgrass areas, potentially resulting in the loss of turf. Clearly a turfgrass manager wouldn't apply these fertilizers at high rates if it would spell certain doom for the turfgrass. Therefore, when turfgrass managers do use synthetic fertilizers like urea, they apply them in light, frequent applications. This gives them exceptional control over the release characteristics of the fertilizer; furthermore, it also allows them to tailor fertilizer applications to avoid heavy rainfall events thereby reducing the risk of leaching. In contrast, organic fertilizers rely heavily on temperature and precipitation to release nitrogen. This is because soil microorganisms generally like warm, moist conditions, and they are responsible for organic fertilizer nitrogen release. The weather is unpredictable, and as a result so are nitrogen release rates of organic nitrogen sources.

Because the nitrogen release rates of organic fertilizers are not predictable, they can increase the number of chemical applications required to maintain living turfgrass. For example, if cool, dry weather conditions persist, there would be very

Organic vs. Synthetic Fertilizer

little nitrogen released from an organic fertilizer, starving the plant of nitrogen. This makes them more susceptible to several plant pathogens (most notably 'dollar spot') as well as weed and insect pests, potentially requiring pesticide applications to keep grass alive. On the other end of the spectrum, if the dry weather pattern breaks and heavy rainfall persists, organic fertilizers can rapidly release nitrogen, causing lush growth that can leave turfgrass susceptible to a new hosts of pests (most notably 'brown patch'). Balanced, consistent nitrogen fertility is a critical tool for reducing turfgrass pesticide inputs and the most effective way to manage nitrogen fertility is through light, frequent applications of synthetic fertilizers.

Another argument against organic fertilizers is the amount of product needed to achieve the same end results as synthetic fertilizers. The average analysis of a bag of urea is 46-0-0, meaning for every 100 pounds of fertilizer, there is 46 pounds of nitrogen contained in that fertilizer with no phosphorus or potassium. The average analysis of a bag of organic fertilizer is something to the extent of 8-3-5. So for every 100 pounds of organic fertilizer there is 8 pounds of nitrogen, 3 pounds of phosphorus and 5 pounds of potassium. Therefore, in order to supply the same amount of nitrogen, one would have to apply 5.75 times more fertilizer.

But This leads directly into the next problem with relying on organic fertilizers. In turfgrass systems, we usually focus primarily on nitrogen management because nitrogen is almost always the 'limiting nutrient'. Most soils (especially glaciated soils of the northeast) have plenty of phosphorus and potassium, and other plant essential nutrients to promote adequate plant growth. Therefore, most of the time turfgrass managers only want to apply nitrogen. With many organic fertilizers this isn't possible because they are derived from animal feces or compost high phosphorus and potassium. So when using an organic fertilizer with the goal of supplying nitrogen, the manager has no choice but to apply phosphorus and potassium. Keep in mind that phosphorus is the nutrient that poses the greatest risk to freshwater resources. If the manager were using urea, this wouldn't be a problem because urea only contains nitrogen.

In summary:

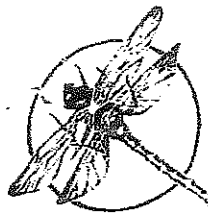
- 1) Nitrogen is nitrogen is nitrogen. There is absolutely no chemical difference in nitrogen (or any other element) derived from organic or synthetic sources.
- 2) Synthetic fertilizers offer greater control over nitrogen release, allowing managers to avoid nitrogen applications during inclement weather, and maintain consistently healthier turfgrass that can require fewer chemical inputs.
- 3) Relying on organic fertilizers to meet nitrogen needs often results in wasteful application of potassium and more importantly, phosphorus. Using synthetic fertilizers containing strictly nitrogen can prevent unnecessary application of phosphorus, the nutrient with the highest risk to freshwater resources.

In Conclusion:

This topic causes a great deal of discussion and controversy even among the worlds most influential crop scientists. As with most agronomic, social or economic problems, there is no one 'right' or 'wrong' answer, but rather a more moderate explanation. When used properly, there is no doubt that there are many practical

Organic vs. Synthetic Fertilizer

and environmental advantages to using synthetic fertilizers. When used improperly, both synthetic AND organic fertilizers can damage sensitive aquatic ecosystems. The best option is to allow educated, capable turfgrass managers to devise effective agronomic strategies that minimize environmental impact while maintaining turfgrass health. I should also point out that maintaining healthy turfgrass and minimizing environmental risks are not mutually exclusive. Several research studies have demonstrated that thick, healthy turfgrass areas reduce leaching, runoff and erosion. The key to reducing environmental impact is judicious use of fertilizers and pesticides, not switching entirely to an organic system.



BEYOND PESTICIDES

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From Sally
Trice

LAWN PESTICIDE FACTS AND FIGURES

A Beyond Pesticides Factsheet

PESTICIDE USAGE

- 78 million households in the U.S. use home and garden pesticides.
- Herbicides account for the highest usage of pesticides in the home and garden sector with over 90 million pounds applied on lawns and gardens per year.ⁱⁱ
- Suburban lawns and gardens receive more pesticide applications per acre (3.2-9.8 lbs) than agriculture (2.7 lbs per acre on average).ⁱⁱⁱ
- Pesticide sales by the chemical industry average \$9.3 billion. Annual sales of the landscape industry are over \$35 billion.^{iv}
- Included in the most commonly used pesticides per pounds per year are: 2,4-D (8-11 million), Glyphosate (5-8 million), MCPP (Mecoprop) (4-6 million), Pendimethalin (3-6 million), Dicamba (2-4 million).^v
- A 2004 national survey reveals that 5 million homeowners use only organic lawn practices and products and 35 million people use both toxic and non-toxic materials.^{vi}

HEALTH & EXPOSURE RISKS

- Of 30 commonly used lawn pesticides 13 are probable or possible carcinogens, 13 are linked with birth defects, 21 with reproductive effects, 15 with neurotoxicity, 26 with liver or kidney damage, 27 are sensitizers and/or irritants, and 11 have the potential to disrupt the endocrine (hormonal) system.^{vii}
- Pregnant women, infants and children, the aged and the chronically ill are at greatest risk from pesticide exposure and chemically induced immune-suppression, which can increase susceptibility to cancer.^{viii} *also autism in children*
- Scientific studies find pesticide residues such as the weedkiller 2,4-D and the insecticide carbaryl inside homes, due to drift and track-in, where they contaminate air, dust, surfaces and carpets and expose children at levels ten times higher than preapplication levels.^{ix}

CHILDREN & PESTICIDES

- Children take in more pesticides relative to body weight than adults and have developing organ systems that make them more vulnerable and less able to detoxify toxins.^x
- The National Academy of Sciences estimates 50% of lifetime pesticide exposure occurs during the first 5 years of life.^{xi}
- A study published in the *Journal of the National Cancer Institute* finds home and garden pesticide use can increase the risk of childhood leukemia by almost seven times.^{xii}
- Studies show low levels of exposure to actual lawn pesticide products are linked to increased rates of miscarriage, and suppression of the nervous, endocrine, and immune systems.^{xiii}
- Exposure to home and garden pesticides can increase a child's likelihood of developing asthma.^{xiv}

- Studies link pesticides with hyperactivity, developmental delays, behavioral disorders, and motor dysfunction.^{xv}
- Children ages 6-11 have higher levels of lawn chemicals in their blood than all other age categories. Biomonitoring studies find that pesticides pass from mother to child through umbilical cord blood and breast milk.^{xvi}

WILDLIFE, PETS & PESTICIDES

- Studies find that dogs exposed to herbicide-treated lawns and gardens can double their chance of developing canine lymphoma and may increase the risk of bladder cancer in certain breeds by four to seven times.^{xvii}
- Of 30 commonly used lawn pesticides: 16 are toxic to birds, 24 are toxic to fish and aquatic organisms, and 11 are deadly to bees.^{xviii}
- Pesticides can be toxic to wildlife and cause food source contamination, behavioral abnormalities that interfere with survival, and death.^{xix}
- Lawn and garden pesticides are deadly to non-target species and can harm beneficial insects and soil microorganisms essential to a naturally healthy lawn.^{xx}

PESTICIDES IN THE WATER

- Of 30 commonly used lawn pesticides, 17 are detected in groundwater, and 23 have the potential to leach.^{xxi}
- Runoff has resulted in a widespread presence of pesticides in streams and groundwater. 2,4-D, found in weed and feed and other lawn products, is the herbicide most frequently detected in streams and shallow ground water from urban lawns.^{xxii}
- Of the 50 chemicals on EPA's list of unregulated drinking water contaminants, several are lawn chemicals including herbicides diazinon, diuron, naphthalene, and various triazines such as atrazine.^{xxiii}
- Runoff from synthetic chemical fertilizers pollutes streams and lakes and causes algae blooms, depleted oxygen and damage to aquatic life.

THE REGISTRATION SYSTEM & PESTICIDE REGULATION

- The health data assessed by EPA for the registration of pesticides comes from the manufacturer of the pesticide. EPA is not obligated under the *Federal Insecticide Fungicide and Rodenticide Act* (FIFRA) to review peer-reviewed scientific literature.
- The U.S. GAO has told Congress on several occasions that the public is misled on pesticide safety by statements characterizing pesticides as "safe" or "harmless." EPA states that no pesticide is 100 percent safe.^{xxiv}
- Pesticide testing protocol was developed before science fully understood the human immune and hormonal system. EPA still does not evaluate data for several neurological effects or disruption of the endocrine (hormonal) system.
- EPA does not evaluate the health and environmental effects of actual pesticide formulations sold on the shelf. Data submitted to the EPA also does not account for low-dose effects, synergistic effects with inerts or combined exposure to more than one pesticide at a time.
- Most states have preemption laws that prohibit localities from passing local pesticide-related ordinances that are stricter than the state policy.^{xxv}

"INERT" INGREDIENTS

- Pesticide products are made of an active ingredient and several inert, or other, ingredients. Inert ingredients are neither chemically, biologically nor toxicologically inert. Inerts are not disclosed to the public due to their status as "trade secrets".
- Active ingredients usually comprise only 5% of the actual product; the other ingredients make up the majority of a given pesticide product or formulation.^{xxvi}
- Inert ingredients can be more toxic to humans than the active ingredient. Ethylene chloride, a nerve poison, is an example of an inert ingredient linked with damage to the heart, eyes, liver, and adrenal glands. *Law does not require pesticide makers to list inert ingredients on packaging*
- 800 out of 1200 inerts are classified as "of unknown toxicity," 57 as highly toxic due to known carcinogenicity, adverse reproductive effects, birth defects, neurotoxicity and/or other chronic effects, and 64 as potentially toxic.^{xxvii}
- 394 chemicals used as inert ingredients are listed as active ingredients in other pesticide products, and more than 200 inerts are considered hazardous pollutants and/or hazardous waste under federal environmental statutes.^{xxviii}

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HEALTH & THE LAWN

- 1) The vast majority of lawn care chemicals currently on the market have not been fully tested for their long-term effects on the environment.
- 2) EPA approval of a lawn care product is in no way a finding of product safety.
- 3) Widespread medical consensus concludes that lawn pesticides are not safe to apply around young children. The Journal of Public Health reported that children who live in homes where weed and insect killers are used are 4 to 5 times more likely to develop cancer.
- 4) A Purdue study showed that dogs are far more likely to get certain kinds of cancers when exposed to lawn chemicals.
- 5) A Defenders of Wildlife study showed that of 30 commonly used lawn pesticides: 16 are toxic to birds, 24 are toxic to fish and aquatic organisms and 11 are deadly to bees.
- 6) The National Cancer Institute reported that lawn care professionals are three to seven times more likely to acquire non-Hodgkins lymphoma than the national average.
- 7) The NCI also showed that lawn pesticide applicators are 2 to 3 times as likely to suffer prostate cancer.
- 8) A study in the American Journal of Industrial Medicine showed that golf course superintendents are twice as likely to suffer brain cancer, while non-Hodgkin's lymphoma also occurred at over twice the national average. Prostate cancer occurred at nearly 3 times the national average and large intestinal cancer occurred at 1.75 times the national average.
- 9) A University of California study showed that children who live in homes where outdoor pesticides are applied are 6.5 times more likely to suffer leukemia.
- 10) Numerous studies, including one at California State, showed the adults who have suffered ill effects from pesticide poisoning are likely to suffer long-term difficulties with their immune systems.
- 11) The National Academy of Sciences reports that at least one out of seven people are significantly harmed by pesticide exposure each year with symptoms ranging from headaches, nausea and fever, to breathing difficulties, seizures, eye pains, vomiting, cramps and diarrhea. Long-term consequences include lowered fertility, birth defects, miscarriages, blindness, liver and kidney dysfunction, neurological damage, heart trouble, stroke, immune system disorders, menstrual problems, memory loss, suicidal depression, cancer and death.
- 12) Low-dose exposures to agricultural and lawn care pesticides may cause injury to developing embryos before a pregnancy is even noticed according to a study conducted by researchers at Marshfield Clinic Research Foundation, and being published in the May 2004 issue of Environmental Health Perspectives.
- 13) The U.S. General Accounting Office has told Congress on several occasions that the public is misled on pesticide safety by statements characterizing pesticides as "safe" or "harmless." EPA states that no pesticide is 100 percent safe.

THE ENVIRONMENT: SOIL

- 1) The United States has the poorest soil in terms of mineral quality of any developed nation in the world due to over-reliance on synthetic fertilizers.
- 2) According to numerous studies by the Soil Food Web laboratory, soils treated with synthetic fertilizers and pesticides have 75 to 80 percent less microbial activity than soils managed in natural or organic programs and 50 percent less microbial activity than soils left unmanaged.

THE ENVIRONMENT: WATER

- 1) In 2001 the Environmental Protection Agency completed a nationwide survey of pesticides in wells that provide drinking water. It showed that more than half of the 94,000 community water system wells and rural wells tested contained nitrates. Nearly 15 percent of residential wells contained lawn pesticides.
- 2) The EPA estimates that homeowners and municipalities use up to two-third of available drinking water on lawn watering during peak times of the growing season.
- 3) Water has to be pumped great distances, especially out West. The city of Irvine, Calif., has estimated that watering one acre of lawn for one year consumes as much energy as mowing the lawn.
- 4) A recent test on Long Island in New York showed that, on average, 60 percent of the nitrogen applied to lawns wound up in groundwater. The EPA estimates that only 35 percent of lawn fertilizers ever reach the grass plant; the remainder is volatilized into the air, or seeps into groundwater.
- 5) NASA scientists estimate that fertilizer and pesticide runoff from lawns contribute up to 20 percent of the Dead Zone at the mouth of the Mississippi River in the Gulf of Mexico, which is an area the size of Rhode Island.

THE ENVIRONMENT: AIR

- 1) The EPA estimates that the amount of pollution emitted by a lawn mower operating for one hour equals the amount of pollution emitted by a car driven for about 360 miles (One average hour of lawn mower use produces emissions of: 353 grams (0.78 lb) volatile organic compounds; 1038 g (2.3 lb) carbon monoxide; 0.68 g (0.002 lb) nitrous oxide; and 1950 g (4.3 lb) carbon dioxide).
- 2) A Los Angeles study showed that lawn equipment emits as much air pollution as all the flights arriving and departing daily from the city's airports.
- 3) Lawn mowers and other gas-powered lawn care equipment contribute 10 percent of the nation's air pollution, according to the EPA.
- 4) The EPA estimates that only 2 percent of pesticides actually reach the target pest; the remainder volatilizes in the air, hits unintended targets, or seeps into groundwater.



GENERAL LAWN FACTS

- 1) Lawns cover between 30 and 50 million acres in the United States, according to varying estimates.
- 2) The average American homeowner spends 40 hours per year mowing the lawn.
- 3) Of 103.9 million households with lawns, more than half (58 million) use insecticides; 40 million use herbicides; 14 million use fungicides.
- 4) The average size of the home lawn is one third of an acre.
- 5) Nearly 20 million pieces of motorized lawn & gardening equipment are now sold each year, with more than 100 million currently in use.
- 6) Americans apply approximately 80 million tons of synthetic lawn fertilizers per year.
- 7) The National Academy of Sciences found that homeowners use up to 10 times more chemical pesticides per acre than do farmers.
- 8) A one-acre lawn generates almost six tons of grass clippings a year, or nearly 1,000 garbage bags full. As a result, most existing legal landfills are estimated to be full by 2010 according to a study conducted by the U.S. Congress.
- 9) The average 40-pound bag of synthetic lawn fertilizer, with 30 percent nitrogen by weight, required the fossil fuel equivalent of 3 gallons of gasoline during manufacturing and shipping.
- 10) Homeowners contribute significantly to the nearly 60 million pounds of glyphosate (Roundup) applications each year; the compound has been linked to numerous health and environmental risks.
- 11) Counting fertilizer production and distribution, along with fuel used in mowing, trimming and pumping water, the nation utilizes approximately 2.2 billion gallons of fuel per year, or 18 gallons per year.
- 12) Homeowners apply approximately 80 million pounds of pesticides on lawns per year.
- 13) Studies by the New York Board of Pesticide Control showed that 8 of 10 people do not read Caution, Warning and Danger labels on pesticide products.
- 14) A 2004 national survey by the National Gardening Association reveals that 5 million homeowners use only organic lawn practices and products and 35 million people use both organic and synthetic materials.

10 ESSENTIAL TIPS FOR A NATURAL LAWN

- 1.) **Obtain a Soil Test** — Never spend money on any fertilizer or soil amendment without first consulting the results of a soil test first.
- 2.) **Grow the Right Grass** — The most common lawn grasses in North America, Kentucky bluegrass and Bermudagrass, also need the most water and fertilizer to grow well. Other species such as perennial ryegrass, fescue, seashore paspalum and centipede grass may be better for your region of the country.
- 3.) **Water Well** — Morning watering is always recommended so that the surface of the lawn dries off during the day. Water deeply and infrequently so the roots of the grass learn to grow down into the soil to get the water they need.
- 4.) **Think of Your Soil as Alive** — “Dirt” is what you track into your house. The material that grows your lawn, the soil, is alive with organisms large and small. Nurturing that life through proper use of natural materials will lead to a successful natural lawn.
- 5.) **Mow Properly** — Recycling your grass clippings by leaving them on the lawn will provide approximately half of your lawn’s fertilizer needs for the season. Keep your mower blades sharp. Depending on the species — Bermudagrass and seashore paspalum are the exceptions — lawns should be mowed no lower than 2.5 inches, even higher in the summer.
- 6.) **Avoid Synthetic Materials** — Fertilizers manufactured in a laboratory often burn lawn grasses and soils. Fertilizers and soil amendments should come from materials that were once living plants or animals, or mined minerals such as lime or sulfur.
- 7.) **Add Compost** — Nature’s most magical soil additive, compost, contains all sorts of beneficial microorganisms that add life to the soil. These organisms will interact with the organic fertilizers to provide the green lawn many of us covet. Compost in liquid form, known as compost tea or extract, should be used in combination with dry compost because the liquid form is available to the soil and grass more quickly. This is especially important during the years of transition from a synthetic system.
- 8.) **See Weeds as Messengers** — Weeds usually appear on lawns only when something is wrong with the soil. Even if we kill the weeds, they will come back unless we fix the underlying problem within the soil.
- 9.) **See Insects as Messengers** — A rush of new grass growth caused by synthetic fertilizers will often attract insects. Predatory insects are rarely a problem in a natural system that is in balance.
- 10.) **Overseed Regularly** — In nature, all plants produce seed to reproduce themselves. In a lawn system, where we mow regularly, grass is not allowed to reproduce and even the healthiest plants get tired. By overseeding in spring or fall, you are introducing robust young plants that will fill in bare areas and compete aggressively against weeds.

Environment



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Chemicals linked to kids' lower IQs

Studies identify effects from
pesticides still used on farms

By Janet Raloff

Children exposed in utero to substantial levels of neurotoxic pesticides have somewhat lower IQs by the time they enter school than do kids with virtually no exposure, three studies find.

The researchers screened women for exposure to organophosphate compounds such as chlorpyrifos, diazinon and malathion. These bug killers, which can cross the human placenta, work by inhibiting brain-signaling compounds. Although the pesticides' residential use was phased out in 2000, spraying on farm fields remains legal.

All three studies began in the late 1990s and followed children through age 7. In more than 300 low-income Mexican-American families, exposures came mostly from farmwork, researchers from the University of California, Berkeley and their colleagues report. In two comparably sized New York City populations, exposures probably traced to bug spraying of homes or eating treated produce.

Among the California families, the average IQ for the 20 percent of children with the highest prenatal organophosphate exposure was seven points lower compared with the least-exposed group.

A Columbia University study followed low-income black and Hispanic mothers. Each additional 4.6 picograms of chlorpyrifos per gram of blood in a woman during pregnancy correlated with a drop of 1.4 percent in her youngster's IQ and 2.8 percent in a measure of the child's working memory.

A more diverse group of New York City families recruited by the Mount Sinai School of Medicine points to genetics as a major determinant of risk. Children who

showed the biggest cognitive impacts tended to have mothers carrying a gene variant for a slow-acting version of the enzyme that breaks down organophosphates. This variant is present in roughly one-third of all Americans, says study leader Stephanie Engel, now at the University of North Carolina at Chapel Hill.

All three studies appear online April 21 in *Environmental Health Perspectives*.

"There was an amazing degree of consistency in the findings across all three studies," notes Bruce Lanphear of Simon

Fraser University in Vancouver. That's concerning, he says, because a drop of seven IQ points "is a big deal. In fact, half of seven IQ points would be a big deal, especially when you see this across a population."

Each IQ-point drop will add up to extra costs in lost earnings over an individual's lifetime, he says — and even, potentially, to higher education and other costs to deal with behavioral and learning problems that may occur during childhood.

Ozone loss makes subtropics rainier

Antarctic hole changes weather patterns almost to equator

By Alexandra Witze

From high above the South Pole, Earth's ozone hole can affect rainfall as far away as the tropics, scientists have found.

Thinning ozone pulls weather patterns southward in the Southern Hemisphere, bringing more rain to a band that includes eastern Australia and the southwestern Indian Ocean, researchers report online April 21 in *Science*.

Previous studies have shown how annual ozone thinning affects polar weather by cooling the upper atmosphere. Sarah Kang, a postdoctoral fellow at Columbia University's engineering school in New York City, and her colleagues wanted to see if these changes stretch toward the equator.

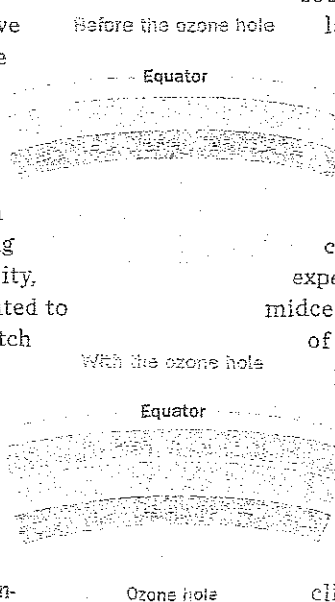
The scientists used computer simulations to

By pulling atmospheric circulation patterns poleward, the Antarctic ozone hole has brought more rainfall south of the equator.

model how climate would behave with and without the ozone hole, then compared those findings with observations of rainfall from 1979 to 2000. The models with the ozone hole best matched the rainfall record for that period, which saw lots of precipitation between about 15° and 35° S latitude.

The shift happens, Kang says, because ozone loss causes a westerly atmospheric jet to move further south, which pulls a mid-latitude band of dry air south. The region near the equator, in turn, gets wetter.

The 1989 Montreal Protocol banned many ozone-destroying chemicals, and scientists expect the hole to recover by midcentury. But rising levels of greenhouse gases also push atmospheric jets southward, so global warming may counteract any changes from the healing ozone hole, says Nathan Gillett of Environment Canada's climate modeling center in Victoria.



Exclusive Golf Course Is Organic

By BILL PENNINGTON

EDGARTOWN, Mass. — Standing alongside the 13th green at the Vineyard Golf Club on Martha's Vineyard, Jeff Carlson spotted a small broadleaf weed between his feet. As the superintendent charged with maintaining the club grounds, he instinctively bent to pluck it, then stopped.

"We have a weed here or there," he said unapologetically. It was the rarest acknowledgment in American golf course landscaping — the Vineyard Golf Club is not meant to be as unnaturally perfect as many of the country's best-known courses.

Opened eight years ago, the club is thought to be the only completely organic golf course in the United States, its 18 holes groomed without the use of a single synthetic pesticide, fertilizer, herbicide or other artificial chemical treatment.

"When we started here, some of my peers thought this golf course would be a dust bowl," Carlson said, walking across a lush, smooth green toward a rolling, verdant fairway. "I admit I wasn't so sure it could be done myself. People said we were crazy."

The club has a more prominent endorsement now. The nation's first golfer, President Obama, is expected to play here while vacationing this month, after playing the course twice last year.

With golf courses increasingly being criticized for environmentally unfriendly practices, the Vineyard Golf Club has become a petri dish for alternative maintenance techniques. Carlson has learned to kill weeds with boiling water and a natural foam cocktail and to remove moss with kitchen dish detergent, and he has transported microscopic worms from Iowa to attack turf-ruining grubs. He has disrupted the mating cycle of damaging oriental beetles with a strategically placed scent and has grown grass that he believes is more resistant to disease because it developed without chemicals.

The staff at the Vineyard Golf Club are now seen as environmental pioneers, with many in the golf industry examining their methods. The club's organic model could become the successful experiment that helps push thousands of courses toward using fewer pesticides, less water and more natural grass-growing procedures.

"Everyone won't be able to go fully organic, but we're proving you can severely cut back on synthetic chemicals," Carlson said. When the Vineyard Golf Club opened, it was the first club in 30 years built on Martha's Vineyard, where the wealthy, many of them environmentally conscious but also accustomed to playing on chemically enhanced private courses, have long kept summer homes.

Opposition to the project on this liberal-leaning island was fierce. It helped the project that the land was also zoned for a 148-lot subdivision. The Martha's Vineyard Commission eventually allowed the course to be built with conditions prohibiting the use of any product whose active ingredient was synthetically produced.

Bill Wilcox, a water resource planner for the commission, called the club a good neighbor and said he knew of no major complaints against it. Although the club is private, with 288 proprietary members — the initiation fee is \$350,000 with annual dues of \$12,000 — the deal with the commission includes a condition that 125 island residents be accepted as members with no initiation fee and annual dues of \$725.

Carlson, 61, had experience building a golf course with conservationists watching, having worked with the noted architect Michael Hurdzan during the 1990s in the creation of the Widow's Walk Golf Course in Scituate, Mass. That course is known as America's first environmental demonstration course, although it was maintained with some synthetic materials.

"Nobody had tried what we were trying," Carlson said.

Cruising the Martha's Vineyard club on a golf cart last week, Carlson recalled one of his earliest jobs in the business, in which he mixed mercury-based fungicides by hand, occasionally near the on-course house where he lived with his wife, Kathy.

"Kathy has beautiful, thick red hair, and it started to fall out," he said. "She went to the doctor, who did some tests and was told she had heavy-metal poisoning. Obviously, I stopped using that stuff. All these years later, it has been kind of satisfying to be trying something so very different."

In the golf community, there is no clear definition of what constitutes an organic course. A 79-page report prepared by a consortium of golf and environmental experts proposed definitions earlier this year but did not settle the issue. The report listed about two dozen courses that call themselves organic, but noted that most used some synthetic chemical pesticide, fertilizer or wetting agent.

"The Vineyard Golf Club has gone further than anyone organically, especially for that level of golf course and considering what they've achieved over the years," said Paul Parker, the chief author of the report.

When Vineyard Golf Club opened in 2002, Carlson was in hand-to-hand combat with fungal diseases, insects, grubs and the skunks, crows and raccoons that tore up the turf to get to the grubs. There was also the matter of teaching the membership that nothing in the rules of golf mandated that the game always be played on green grass.

"We had to promote the notion of playability rather than visual perfection," Carlson said.

Still, the grubs were particularly vexing. A synthetic insecticide application would have made things easy. But Carlson discovered a specific kind of beneficial nematode, a roundworm that would attack the grubs from within the soil. It occasionally meant flying in the nematodes from Iowa packed in dry ice.

When it came to the skunks, crows and raccoons, the club went old school. It turned to a retired local fisherman — whom some have compared to Carl Spackler, the character played by Bill Murray in the golf movie "Caddyshack" — who was known on the island for his ability to trap and remove those creatures.

Nothing at the Vineyard Golf Club, now in its ninth season, is left to chance. To prevent fungal disease, crews go out daily at dawn using a long, whip-like device that whisks condensation off the grass throughout the course's 69 acres. And visitors have their shoes cleaned before they play to keep contrary grass seeds or diseases from infiltrating the fairways and greens. The club's maintenance labor budget is higher than those of most clubs its size, but Carlson said his net costs were the same "because of the money we save on traditional pesticides, which are very expensive."

The Vineyard Golf Club greens are devoid of weeds or major blemishes, and they roll true and consistent. The fairways have patches of crabgrass and clover that are barely noticeable. What is most obvious in a walk of the holes is a striking and scenic layout pocked with deep, distinctive sod-faced bunkers designed by the British architects Donald Steel and Tom Mackenzie.

"Yes, it is not perfect out there, but even if your ball comes to rest next to a shaved-down broadleaf weed, it's not going to affect your shot," said Gene Mulak, the club's golf pro.

Private golf course members are notoriously hard on superintendents, but Carlson says those at the Vineyard Golf Club are "real environmental pioneers because they put down the money for this experiment."

Sally Rorer, a charter member, said members were proud of the club's organic approach. "It makes it easier to put a sandwich down on the ground between shots, too," she said.

What practices and techniques might be transferable from Martha's Vineyard, where golf courses are generally open only eight months a year, to other parts of the country is debatable.

"Most golf courses wouldn't make it with an approach so organic, especially year after year with changeable weather," said James Snow, the national director of the United States Golf Association's Green Section. "But over time, we're going to be using less synthetics, and that's a good thing." These days, walking past the occasional weed, Carlson has moved on to other goals.

"We're trying to be like any other golf course," he said. "I don't want people to come here and say, 'That was a real good golf course for an organic golf course.'"

"I hate hearing that."

Melissa Graffam - RE: Lucas Tree Testimony

From: "Cohen, James" <jcohen@verrilldana.com>
To: 'Troy Moon' <THM@portlandmaine.gov>
Date: 10/9/2015 3:22 PM
Subject: RE: Lucas Tree Testimony
CC: 'Deven Morrill' <dmorrill@LucasTree.com>, "'jobrien@downeastturf.com'" <...
Attachments: Title 38 Sec 419 -- Fertilizer with Phosphates.PDF; Dept Ag Chap 27 -- IPM on School Grounds.pdf; ACF Ch. 22 -- Outdoor Pesticide Application.pdf; Testimony of Deven Morrill toPortland Transport and Environ Commtee -- 10-7-15.pdf

Thanks Troy, and we appreciated the chance to provide comments on Wednesday.

Per your request, a copy of Deven's testimony is attached.

I am also attaching copies of three provisions that may be helpful in addressing several issues raised during the meeting:

1. **Chapter 27 of the Rules of the Dept. of Ag, Cons, and Forestry.** This rule sets for the procedures that schools must follow regarding Integrated Pest Management. The rule also includes several provisions governing the application of pesticides on school property, including when applications may occur and the requirements of public notice.
2. **Chapter 22 of the Rules of the Board of Pesticide Control.** This rule contains numerous restrictions related to how and where pesticides may be applied, including the so-called "drift rule" that limits the ability to apply pesticides in a manner that would result in the materials drifting into adjacent properties or otherwise impacting humans or animals.
3. **Title 38, Section 419.** This provision of law administered by the DEP limits the sale of fertilizers containing phosphates.

As a final note, the term "pesticide" was used frequently during the hearing, but the term itself under state law does not distinguish between organic and synthetic products, or otherwise relate to what is contained within the product. Rather, the definition is based on what the product does, as noted below. I thought it would be helpful to as it appeared that some members of the public appeared to misuse the term in their commentary.

**7 MRSA
 §604(25).
 Pesticide.**
 "Pesticide"
 means any
 substance
 or mixture
 of
 substances
 intended
 for
 preventing,
 destroying,
 repelling or
 mitigating

any pests
and any
substance
or mixture
of
substances
intended
for use as a
plant
regulator,
defoliant
or
desiccant.
"Pesticide"
includes
"highly
toxic
pesticide."

I hope this information is helpful, and let us know if we can provide any additional information.

Best,
Jim

James I. Cohen, Partner
One Portland Square
Portland, ME 04112-0586
Office: (207) 253-4708
Bio: verrilldana.com/jcohen



Portland, ME | Augusta, ME

From: Troy Moon [mailto:THM@portlandmaine.gov]
Sent: Thursday, October 08, 2015 11:58 AM
To: Cohen, James
Subject: Lucas Tree Testimony

Hi Jim,

It was good to see you last night. It was also good to see a healthy debate on the pesticide issue. The TS&E Committee members appreciated hearing a range of perspectives.

As a follow up - do you have a copy of the Lucas Tree testimony provided by Deven? I had a difficult time following all of his points about the draft ordinance but they were substantive and I would like to make sure we capture them correctly.

Thanks for your help,

Maine Revised Statutes
Title 38: WATERS AND NAVIGATION

Chapter 3: PROTECTION AND IMPROVEMENT OF WATERS

§419. CLEANING AGENTS AND LAWN AND TURF FERTILIZER CONTAINING PHOSPHATE BANNED

1. Definitions. As used in this section, unless the context otherwise indicates, the following terms have the following meanings.

A. "Dairy equipment" means equipment used by farmers or processors for the manufacture or processing of milk and dairy products. [2007, c. 65, §1 (AMD).]

A-1. "Compost" means a biologically stable material derived from the composting process. [2007, c. 65, §1 (NEW).]

A-2. "Composting" means the biological decomposition of organic matter. It is accomplished by mixing and piling organic matter in such a way as to promote aerobic decay, anaerobic decay or both. [2007, c. 65, §1 (NEW).]

A-3. "Fertilizer" means a substance containing one or more recognized plant nutrients that is used for its plant nutrient content and designed for use or claimed to have value in promoting plant growth. "Fertilizer" does not include animal and vegetable manures that are not manipulated, marl, lime, limestone or topsoil. [2007, c. 65, §1 (NEW).]

A-4. "Fertilizer containing phosphorus" means a fertilizer containing more than 0.67% phosphate by weight. [2007, c. 65, §1 (NEW).]

B. "Food processing equipment" means equipment used for the processing and packaging of food for sale, except that equipment used at restaurants and similar places of business is not included within the meaning of "food processing equipment." [2007, c. 65, §1 (AMD).]

C. "High phosphorous detergent" means any detergent, presoak, soap, enzyme or other cleaning agent containing more than 8.7% phosphorous, by weight, but does not include detergent having a recommended use level that contains less than 7 grams of phosphorous by weight. [2007, c. 65, §1 (AMD).]

C-1. "Household laundry detergent" means a cleaning agent used primarily in private residences for washing clothes. [2007, c. 65, §1 (AMD).]

D. "Industrial equipment" means equipment used by industrial concerns that are located on any brook, stream or river. [2007, c. 65, §1 (AMD).]

D-1. "Manipulated" means a process by which fertilizers are manufactured, blended or mixed or animal or vegetable manures are treated in any manner, including mechanical drying, grinding, pelleting and other means, or by adding other chemicals or substances. [2007, c. 65, §1 (NEW).]

E. "Person" means any individual, firm, association, partnership, corporation, municipality, quasi-municipal organization, agency of the State or other legal entity. [2007, c. 65, §1 (AMD).]

[2007, c. 65, §1 (AMD).]

2. Prohibition. A person may not:

A. Sell or use a high phosphorus detergent; or [2007, c. 65, §1 (NEW).]

B. Sell fertilizer containing phosphorus at a retail store after January 1, 2008 unless the seller posts a department-approved sign that indicates that the product is not appropriate for use on nonagricultural lawns or turf due to potential adverse effects on water quality, except when:

(1) Soil test results from a laboratory indicate that additional phosphorus is needed for that lawn or turf; or

(2) The fertilizer will be used in establishing a new lawn or turf, including establishing turf at a sod farm, or for reseeding or overseeding an existing lawn or turf.

The sign required by this paragraph must be positioned between 4 and 7 feet above the floor and prominently posted where fertilizers containing phosphorus for use on lawns or turf are displayed. For purposes of this paragraph, "retail store" means a commercial establishment that sells fertilizer on the store premises for use off the premises. [2007, c. 65, §1 (NEW) .]

[2007, c. 65, §1 (AMD) .]

2-A. Household laundry detergent. After July 1, 1993, a person may not sell or offer for sale in this State a household laundry detergent that contains more than 0.5% phosphorus by weight expressed as elemental phosphorus.

[1991, c. 838, §22 (NEW) .]

3. Exception. Subsection 2 does not apply to :

A. A high phosphorous detergent sold and used for the purpose of cleaning dairy equipment, food processing equipment and industrial equipment; [2007, c. 65, §1 (NEW) .]

B. Fertilizers used for agricultural crops or for flower or vegetable gardening; or [2007, c. 65, §1 (NEW) .]

C. Compost. [2007, c. 65, §1 (NEW) .]

[2007, c. 65, §1 (AMD) .]

4. Penalty.

[1977, c. 300, §23 (RP) .]

SECTION HISTORY

1971, c. 544, §128 (NEW). 1977, c. 300, §23 (AMD). 1983, c. 566, §22 (AMD). 1985, c. 332, (AMD). 1991, c. 838, §§21,22 (AMD). 2007, c. 65, §1 (AMD) .

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01 DEPARTMENT OF AGRICULTURE, CONSERVATION AND FORESTRY

026 BOARD OF PESTICIDES CONTROL

Chapter 27: STANDARDS FOR PESTICIDE APPLICATIONS AND PUBLIC NOTIFICATION IN SCHOOLS

SUMMARY: This rule establishes procedures and standards for applying pesticides in school buildings and on school grounds. This rule also sets forth the requirements for notifying school staff, students, visitors, parents and guardians about pending pesticide applications.

Section 1. Definitions

- A. **Integrated Pest Management.** For the purposes of this rule, Integrated Pest Management (IPM) means the selection, integration and implementation of pest damage prevention and control based on predicted socioeconomic and ecological consequences, including:
- (1) understanding the system in which the pest exists,
 - (2) establishing dynamic economic or aesthetic injury thresholds and determining whether the organism or organism complex warrants control,
 - (3) monitoring pests and natural enemies,
 - (4) when needed, selecting the appropriate system of cultural, mechanical, genetic, including resistant cultivars, biological or chemical prevention techniques or controls for desired suppression, and
 - (5) systematically evaluating the pest management approaches utilized.
- B. **School.** For the purposes of this rule, School means any public, private or tribally funded:
- (1) elementary school,
 - (2) secondary school,
 - (3) kindergarten or
 - (4) nursery school that is part of an elementary or secondary school.
- C. **School Building.** For the purposes of this rule, School Building means any structure used or occupied by students or staff of any school.

- D. **School Grounds.** For the purposes of this rule, School Grounds means:
- (1) land associated with a school building including playgrounds, athletic fields and agricultural fields used by students or staff of a school, and
 - (2) any other outdoor area used by students or staff including property owned by a municipality or a private entity that is regularly utilized for school activities by students and staff. School grounds do not include land utilized primarily for non-school activities, such as golf courses and museums.
- E. **Integrated Pest Management Coordinator.** An employee of the school system or school who is knowledgeable about integrated pest management and is designated by each school to implement the school pest management policy.
- F. **School Session.** For the purposes of this rule, school is considered to be in session during the school year including weekends. School is not considered to be in session during any vacation of at least one week.

Section 2. Requirements for All Schools

- A. All public and private schools in the State of Maine shall adopt and implement a written policy for the application of Integrated Pest Management techniques in school buildings and on school grounds.
- B. Each school shall appoint an IPM Coordinator who shall act as the lead person in implementing the school's Integrated Pest Management policy. The IPM Coordinator shall be responsible for coordinating pest monitoring and pesticide applications, and making sure all notice requirements as set forth in this rule are met. In addition, the IPM Coordinator shall:
- (1) complete Board-approved IPM Coordinator overview training within one month of his/her first appointment as an IPM Coordinator and obtain Board documentation thereof;
 - (2) complete Board-approved IPM Coordinator comprehensive training within one year of his/her first appointment as an IPM Coordinator and obtain Board documentation thereof;
 - (3) obtain at least one hour of Board-approved continuing education annually;
 - (4) maintain and make available to parents, guardians and staff upon request:
 - a. the school's IPM Policy,
 - b. a copy of this rule (CMR 01-026 Chapter 27),
 - c. a "Pest Management Activity Log," which must be kept current. Pest management information must be kept for a minimum of two years from date of entry, and must include:

- i. the specific name of the pest and the IPM steps taken, as described under Section 5C of this rule; and
 - ii. a list of pesticide applications conducted on school grounds, including the date, time, location, trade name of the product applied, EPA Registration number, company name (if applicable) and the name and license number of the applicator. If the product has no EPA Registration number, then a copy of the label must be included.
- (5) authorize any pesticide application not exempted under Sections 3A(2), 3A(3), 3B, 3C, or 3D made in school buildings or on school grounds and so indicate by completing and signing an entry on the Pest Management Activity Log prior to, or on the date on which the minimum notification requirements must be implemented; and
- (6) ensure that any applicable notification provisions required under this rule are implemented as specified.
- C. By September 1, every school shall inform the Board of the identity and the contact information for the IPM Coordinator. This requirement can be fulfilled through a Board approved reporting system.

Section 3. Exemptions

- A. The following pesticide uses are exempt from the requirements of Sections 4 and 5 of this rule:
 - (1) application of ready-to-use general use pesticides by hand or with non-powered equipment to control or repel stinging or biting insects when there is an urgent need to mitigate or eliminate a pest that threatens the health or safety of a student, staff member or visitor,
 - (2) application of general use antimicrobial products by hand or with non-powered equipment to interior or exterior surfaces and furnishings during the course of routine cleaning procedures, and
 - (3) application of paints, stains or wood preservatives that are classified as general use pesticides.
- B. The following pesticide uses are exempt from the requirements of Section 4 of this rule:
 - (1) pesticides injected into cracks, crevices or wall voids,
 - (2) bait blocks, gels, pastes, granular and pelletized materials placed in areas inaccessible to students,
 - (3) indoor application of a pesticide with no re-entry or restricted entry interval specified on its label but entry to the treated area is restricted for at least 24 hours.

- C. When the Maine Center for Disease Control has identified arbovirus positive animals (including mosquitoes and ticks) in the area, powered applications for mosquito control are exempt from Section 4B(1) and 5C. Applicators should post the treated area as soon as practical, in a manner consistent with Section 4B(2).
- D. School education facilities utilized for agricultural or horticultural education, and not normally used by the general school population, such as, but not limited to, greenhouses, nursery plots or agricultural fields, are exempt from the application limitations contained in Section 5E and notification provisions contained in Section 4B(1) provided that parents, staff and students are informed about the potential for pesticide applications in such areas. The posting requirements contained in Section 4B(2) must be complied with. In addition, students entering treated areas must be trained as agricultural workers, as defined by the federal Worker Protection Standard.

Section 4. Notification

- A. A notice shall be included in the school's policy manual or handbook describing the school's IPM program including that a school integrated pest management policy exists and where it may be reviewed, that pesticides may periodically be applied in school buildings and on school grounds and that applications will be noticed in accordance with Section 4B hereof. This notice shall describe how to contact the IPM Coordinator and shall also state that the school's IPM Policy, a copy of the *Standards for Pesticide Applications and Public Notification in Schools* rule (CMR 01-026 Chapter 27), and the Pest Management Activity Log, are available for review.
- B. When school is in session, schools shall provide notice of pesticide applications in accordance with Sections 4B(1) and 4B(2). When school is not in session, notice shall be accomplished by posting of signs as described in Section 4B(2) of this rule.
 - (1) The school shall provide notification of each application not exempted by Section 3 performed inside a school building or on school grounds to all school staff and parents or guardians of students. Notices given shall state, at a minimum: (a) the trade name and EPA Registration number of the pesticide to be applied; (b) the approximate date and time of the application; (c) the location of the application; (d) the reasons for the application; and (e) the name and phone number of the person to whom further inquiry regarding the application may be made. These notices must be sent at least five days prior to the planned application.
 - (2) In addition to the notice provisions above, whenever pesticide applications not exempted by Section 3 are performed in a school building or on school grounds, a sign shall be posted at each point of access to the treated area and in a common area of the school at least two working days prior to the application and for at least forty-eight hours following the application. Posting of the notification signs as required by this rule satisfies the posting requirements of Chapter 28 of the Board's rules (CMR 01-026 Chapter 28).

- a. The signs shall:
 - i. be light colored (white, beige, yellow or pink) with dark, bold letters (black, blue, red or green).
 - ii. bear the word CAUTION in 72 point type,
 - iii. bear the words PESTICIDE APPLICATION NOTICE in 30 point type or larger,
 - iv. state any reentry precautions from the pesticide labeling in at least 12 point type,
 - v. state the approximate date and time of the application in at least 12 point type, and
 - vi. state the name of the company or licensed applicator making the pesticide application and a contact telephone number in at least 12 point type,
- b. The signs for indoor applications must:
 - i. be at least 8.5 inches wide by 11 inches tall,
 - ii. state the trade name and EPA Registration number(s) of the pesticide(s) to be applied in at least 12 point type,
 - iii. state the location of the application in at least 12 point type, and
 - iv. state the reason(s) for the application in at least 12 point type.
- c. The signs for outdoor applications must:
 - i. be at least 5 inches wide by 4 inches tall,
 - ii. be made of rigid, weather-resistant material that will last at least ninety-six (96) hours when placed outdoors,
 - iii. bear the Board designated symbol (see appendix A), and
 - iv. state a date and/or time to remove the sign.

Section 5. Integrated Pest Management Techniques

- A. All pest management activities shall be undertaken with the recognition that it is the policy of the State to work to find ways to use the minimum amount of pesticides needed to effectively control targeted pests in all areas of application. In all cases, applications should be conducted in a manner to minimize human risk to the maximum extent practicable using currently available technology.

- B. All pest management activities should be conducted using appropriate elements of integrated pest management as described in the latest Cooperative Extension or Department of Agriculture training manuals for pest management in and/or on school property. Pest management activities should also be conducted in accordance with the Best Management Practices for Athletic Fields & School Grounds, or other applicable Best Management Practices approved by the Board.
- C. Prior to any pesticide application the following steps must be taken and recorded:
 - (1) monitor for pest presence or conditions conducive to a pest outbreak,
 - (2) identify the pest specifically,
 - (3) determine that the pest population exceeds acceptable safety, economic or aesthetic threshold levels, and
 - (4) utilize non-pesticide control measures that have been demonstrated to be practicable, effective and affordable.
- D. When a pesticide application is deemed necessary, the applicator must comply with all the requirements of CMR 01-026 Chapter 31—Certification and Licensing Provisions/Commercial Applicator. The applicator must also take into account the toxicity of recommended products and choose lowest risk products based on efficacy, the potential for exposure, the signal word on the pesticide label, the material safety data sheet, other toxicology data and any other label language indicating special problems such as toxicity to wildlife or likelihood of contaminating surface or ground water.
- E. Indoor pesticide use must be limited to placement of baits and wall void or crack and crevice and pool and spa disinfectant treatments unless the pest threatens the health and safety of persons in the buildings as determined by the school's integrated pest management coordinator.
- F. Pesticide applications must not be conducted when people are in the same room to be treated except that applicators may set out bait blocks, pastes or gels when only informed staff members are present. When space, spot, surface or fumigation applications are conducted the ventilation and air conditioning systems in the area must be shut off or the entire building must be evacuated. Applications should be planned to occur on weekends or vacations to allow maximum time for sprays to dry and vapors to dissipate.
- G. Outdoor applications should be scheduled so as to allow the maximum time for sprays to dry and vapors to dissipate and shall not occur when unprotected persons are in the target area or in such proximity as to likely result in unconsenting exposure to pesticides. Applications must also be conducted in accordance with all other applicable Board rules designed for minimizing pesticide drift and posting of treated sites. Spot treatments should be considered in lieu of broadcast applications.

Section 6. Requirements for Commercial Pesticide Applicators Making Applications in School Buildings or on School Grounds

- A. Prior to conducting a pesticide application not exempted in Section 3 in a school building or on school grounds, commercial pesticide applicators shall obtain written authorization from the IPM Coordinator. Authorization must be specific to each application and given no more than 10 days prior to the planned application.
- B. Commercial pesticide applicators shall, within one business day of each pesticide application, provide the IPM Coordinator with a written record of the application including the date, time, location, trade name of the product applied, EPA Registration number and the name of the licensed applicator. If the product has no EPA Registration number then the applicator will provide a copy of the label.
- C. Commercial pesticide applicators shall inform the IPM Coordinator about any pest monitoring activity and results. If it is acceptable to the IPM Coordinator, this may be achieved by recording them in the Pest Management Activity Log.

STATUTORY AUTHORITY: 7 M.R.S.A. §§ 601-625 and 22 M.R.S.A. §§ 1471-A-X

EFFECTIVE DATE:

August 30, 2003, filing 2002-408 accepted October 24, 2002.

AMENDED:

July 5, 2005 – filing 2005-266

March 4, 2007 – Section 3(C), filing 2007-67

August 29, 2013 – filing 2013-188 (Final adoption, major substantive)

Appendix A

Board Designated Symbol for Posting Outdoor Pesticide Applications to School Grounds



01 DEPARTMENT OF AGRICULTURE, CONSERVATION AND FORESTRY

026 BOARD OF PESTICIDES CONTROL

**Chapter 22: STANDARDS FOR OUTDOOR APPLICATION OF PESTICIDES BY POWERED
EQUIPMENT IN ORDER TO MINIMIZE OFF-TARGET DEPOSITION**

SUMMARY: These regulations establish procedures and standards for the outdoor application of pesticides by powered equipment in order to minimize spray drift and other unconsented exposure to pesticides. The primary purpose of these regulations is to implement the legislative mandate of the Board, as expressed by 7 M.R.S.A. §606(2)(G), to design rules which "minimize pesticide drift to the maximum extent practicable under currently available technology."

SECTION 1. EXEMPTIONS

The regulations established by this chapter shall not apply to pesticide applications in any of the following categories:

- A. Applications of pesticides confined entirely to the interior of a building;
- B. Applications of pesticides by non-powered equipment;
- C. Applications of pesticides exclusively in granular or pelletized form;
- D. Applications of pesticides injected underground or otherwise injected directly into the target medium. Such applications must involve no spraying of pesticides whatsoever.

SECTION 2. STANDARDS OF CONDUCT FOR PESTICIDE APPLICATIONS

All pesticide applications subject to these regulations shall be undertaken in compliance with the following standards of conduct:

- A. **Equipment**
 - I. Pesticide spray equipment shall be used in accordance with its manufacturer's recommendations and instructions, and shall be in sound mechanical condition, free of leaks and other defects or malfunctions which might cause pesticides to be deposited off-target.
 - II. Pesticide spray equipment shall be properly calibrated consistent with Board or University published guidance. Sufficient records to demonstrate proper calibration must be maintained and made available to representatives of the Board upon request.

- III. Pesticide application equipment shall have properly functioning shut-off valves or other mechanisms which enable the operator to prevent direct discharge and minimize drift to non-target areas. Spray equipment designed to draw water must also have a properly functioning antisiphoning device.

B. Weather Conditions

- I. Spray applications shall not be undertaken when weather conditions favor pesticide drift onto Sensitive Areas or otherwise prevent proper deposition of pesticides on target.
- II. Pesticide application must cease immediately when visual observation reveals or should reveal that spray is not being deposited on target.
- III. Without limitation of the other requirements herein, under no circumstances shall pesticide application occur when wind speed in the area is in excess of 15 miles per hour.

C. Identifying and Recording Sensitive Areas

- I. Prior to spraying a pesticide, the applicator must become familiar with the area to be sprayed and must identify and record the existence, type and location of any Sensitive Area located within 500 feet of the target area. Applicators shall prepare a site map or other record, depicting the target area and adjacent Sensitive Areas. The map or other record shall be updated annually. The site map or other record shall be retained by the applicator for a period of two years following the date of applications and shall be made available to representatives of the Board upon request.
- II. This requirement shall not apply to commercial applications conducted under categories 3A (outdoor ornamental), 3B (turf), 6A (rights-of-way vegetation management), 6B (industrial/commercial/municipal vegetation management), 7A (structural general pest control applications), or 7E (biting fly & other arthropod vectors [ticks]).

D. Presence of Humans, Animals

Pesticide applications shall be undertaken in a manner which minimizes exposure to humans, livestock and domestic animals.

The applicator shall cease spray activities at once upon finding evidence showing the likely presence of unprotected persons in the target area or in such proximity as to result in unconsented exposure to pesticides.

E. Other Requirements

These regulations are intended to be minimum standards. Other factors may require the applicator to take special precautions, beyond those set forth in these regulations, in

order to avoid adverse impacts on off-target areas and to protect public health and the environment.

SECTION 3. STANDARDS FOR AERIAL APPLICATION OF PESTICIDES

A. Positive Identification of the Target Site

The person contracting for an aerial pesticide application shall ensure that the application site (i.e., target area) is positively identified prior to application, using a unique and verifiable method, including;

- I. An onboard, geo-referenced electronic mapping and navigation system (e.g., GPS); or
- II. Effective site markings visible to the applicator; or
- III. Other method(s) approved by the Board.

B. Site Plans Required

Prior to spraying by aerial application within 1,000 feet of a Sensitive Area Likely to Be Occupied, the person contracting for the application shall provide to the applicator a site plan that includes:

- I. a site map drawn to scale that:
 - (i) delineates the boundaries of the target area and the property lines;
 - (ii) depicts significant landmarks and flight hazards;
 - (iii) depicts the type and location of any Sensitive Area Likely to Be Occupied within 1,000 feet of the target area; and
 - (iv) depicts other Sensitive Areas within 500 feet of the target area.
- II. If applicable, a school bus schedule shall accompany the site map.
- III. The site plan and site map with identified sensitive areas required under Section 3(B) shall be retained by the applicator for a period of two years following the date of applications and shall be made available to representatives of the Board upon request.
- IV. Compliance with this section satisfies the requirements of Section 2(C).

C. Site-Specific Application Checklist

Prior to conducting an aerial pesticide application within 1,000 feet of a Sensitive Area Likely to Be Occupied, the applicator shall complete a Board-approved pre-application

checklist for each distinct field or target site. The checklist shall be maintained by the applicator for a period of two years and shall be available for inspection by representatives of the Board at reasonable times, upon request. The checklist shall include, at a minimum, the following elements:

- I. The date, time, description of the target site and name of the applicator;
- II. Confirmation that the notification requirements contained in CMR 01-026, Chapters 28 and 51, have been carried out;
- III. Confirmation that the target site has been positively identified;
- IV. The location of where weather conditions are measured and a description of the equipment used to measure the wind speed and direction;
- V. Confirmation that conditions are acceptable to treat the proposed target site, considering the location of any Sensitive Area Likely to Be Occupied and current weather conditions;
- VI. Wind speed and direction;
- VII. The measures used to protect all Sensitive Areas;
- VIII. Confirmation that there are no humans visible in or near the target area.

D. Buffer Zones for any Sensitive Area Likely to Be Occupied

Aerial applicators shall employ site-specific buffer zones adjacent to any Sensitive Area Likely to Be Occupied sufficient to prevent unlawful pesticide drift, unless consent has been granted by the landowner, lessee and occupant (when applicable), consistent with the provisions of Section 4(C) of this rule.

E. Wind Speeds for Aerial Applications

Unless otherwise specified by the product label, an applicator may not conduct an aerial application of pesticides within 1,000 feet of a Sensitive Area Likely to Be Occupied unless the wind speed is between 2 and 10 miles per hour.

SECTION 4. GENERAL STANDARDS FOR OFF-TARGET PESTICIDE DISCHARGE AND RESIDUE

A. Prohibition of Unconsented, Off-Target Direct Discharge of Pesticides

Pesticide applications shall be undertaken in a manner which does not result in off-target direct discharge of pesticides, unless prior authorization and consent is obtained from the owner or lessee of the land onto which such discharge may occur in a manner consistent with the pesticide label.

B. Standards for Unconsented, Off-Target Drift of Pesticides

- I. **General Standard.** Pesticide applications shall be undertaken in a manner which minimizes pesticide drift to the maximum extent practicable, having due regard for prevailing weather conditions, toxicity and propensity to drift of the pesticide, presence of Sensitive Areas in the vicinity, type of application equipment and other pertinent factors.
- II. **Prima Facie Evidence.** Pesticide residues in or on any off-target Sensitive Area Likely to Be Occupied resulting from off-target drift of pesticides from a nearby application that are 1% or greater of the residue in the target area are considered prima facie evidence that the application was not conducted in a manner to minimize drift to the maximum extent practicable. The Board shall review the site-specific application checklist completed by the applicator and other relevant information to determine if a violation has occurred. For purposes of this standard, the residue in the target area, and the residue in the Sensitive Area Likely to Be Occupied, may be adequately determined by evaluation of one or more soil, foliage or other samples, or by extrapolation or other appropriate techniques.
- III. **Standard of Harm.** An applicator may not apply a pesticide in a manner that results in:
 - (i) Off-target pesticide residue detected in or on any nearby crop which violates EPA tolerances for that crop, as established under 40 CFR, Part 180.
 - (ii) Off-target pesticide residue detected in or on any nearby organic farm or garden which causes the agricultural products thereof to be excluded from organic sale in accordance with 7 CFR, Part 205, Section 205.671.
 - (iii) Off-target pesticide residue detected on any nearby persons or vehicles using public roads.
 - (iv) Documented human illness. For this standard to be met, the Board must receive verification from two physicians that an individual has experienced a negative health effect from exposure to an applied pesticide and that the effect is consistent with epidemiological documentation of human sensitivity to the applied pesticide.
 - (v) Off-target damage or injury to any organism.
- IV. **Enforcement Considerations.** The Board shall consider the particular circumstances of violations arising from Subsections 4(B)(I) and (III) in determining an appropriate response, including, but not limited to:
 - (i) The standard of care exercised by the applicator;
 - (ii) The degree of harm or potential harm that resulted from or could have resulted from off-target drift from the application;

- (iii) The risk (toxicity and exposure) of adverse effects from the pesticide applied.

C. Consent

- I. **Consent, How Given.** Authorization and consent by the owner or lessee and occupant (when applicable) of land receiving a pesticide discharge or drift in a manner consistent with the pesticide label may be given in any manner, provided that the consent is reasonably informed and is given prior to the onset of the spray activity in question. The burden of proof shall be upon the applicator to demonstrate that requisite authorization and consent has been given. For this reason, applicators are encouraged to obtain such consent in writing and to maintain records thereof.
- II. The residue and harm standards in Sections 4(B)(II) and (III) for off-target drift do not apply where the owner, lessee and occupant (when applicable) of the off-target area receiving the pesticide drift have given authorization and consent as prescribed in Section 4(C).
- III. Except with the prior written approval of the Board, no authorization or consent may be given with regard to off-target direct discharge or off-target drift of pesticides upon any bodies of water or critical areas as defined in CMR 01-026, Chapter 10, "Definitions; Sensitive Area."

SECTION 5. VARIANCES FROM STANDARDS

A. Variance Permit Application

An applicator may vary from any of the standards imposed under this chapter by obtaining a permit to do so from the Board. Permit applications shall be made on such forms as the Board provides and shall include at least the following information:

- I. The name, address, and telephone number of the applicant;
- II. The area(s) where pesticides will be applied;
- III. The type(s) of pesticides to be applied;
- IV. The purpose for which the pesticide application(s) will be made;
- V. The approximate date(s) of anticipated spray activities;
- VI. The type(s) of spray equipment to be employed;
- VII. The particular standards from which the applicant seeks a variance;

- VIII. The particular reasons why the applicant seeks a variance from such standards, including a detailed description of the techniques to be employed to assure a reasonably equivalent degree of protection and of the monitoring efforts to be made to assure such protection;
- IX. The names and addresses of all owners or lessees of land within 500 feet of the proposed spray activity, and evidence that such persons have been notified of the application. The Board may waive this requirement where compliance would be unduly burdensome and the applicant attempts to notify affected persons in the community by another means which the Board finds reasonable.

B. Board Review; Legal Effect of Permit, Delegation of Authority to Staff

- I. Within 60 days after a complete application is submitted, the Board shall issue a permit if it finds that the applicant will achieve a substantially equivalent degree of protection as adherence to the requirements of this chapter would provide and will conduct spray activities in a manner which protects human health and the environment. Such permit shall authorize a variance only from those particular standards for which variance is expressly requested in the application and is expressly granted in the permit. The Board may place conditions on any such permit, and the applicant shall comply with such conditions. Except as conditioned in the permit, the applicant shall undertake spray activities in accordance with all of the procedures described in the application and all other applicable legal standards. Permits issued by the Board under this section shall not be transferable or assignable except with further written approval of the Board and shall be valid only for the period specified in the permit.
- II. The Board may delegate authority to review applications and issue permits to the staff as it feels appropriate. All conditions and limitations as described in Section 5(B) I shall remain in effect for permits issued by the staff. If the staff does not grant the variance permit, the applicator may petition the Board for exemption following the requirements set forth in 22 M.R.S.A. §1471-T, "Exemptions."

SECTION 6. EMERGENCIES

- A. In the event that severe pest or weather conditions threaten to cause a significant natural resource and/or economic loss, as determined by the Commissioner of the Maine Department of Agriculture, Conservation and Forestry, the requirements contained in Section 3 of this Chapter shall be waived, subject to the following conditions:
 - I. The severe pest and/or weather conditions must necessitate immediate wide-scale aerial application of pesticides.
 - II. The immediate need for aerial pesticide application does not provide sufficient time to complete the requirements of Section 3 of this Chapter,
 - III. Prior to any aerial application, the Commissioner shall issue a press release notifying residents of affected regions about the emergency, the likelihood of

aerial application in the affected regions and the approximate dates that the emergency may continue.

- IV. The Commissioner, in consultation with the Board's staff, shall specify the requirements in Section 3 that will be waived.
- V. Land managers and aerial applicators shall make good faith efforts to comply with the intent of Section 3 and minimize off-target drift to Sensitive Areas.
- B. When the Maine Center for Disease Control and Prevention (CDC) recommends control of disease vectors, government sponsored vector control programs are exempt from Sections 2C, 2D, 3B, 3C, 3D, 3E and 4 of this chapter, provided that reasonable efforts are made to avoid spraying non-target areas.

June 12, 2009 amendments become effective on January 1, 2010.

STATUTORY AUTHORITY: 7 M.R.S.A. §606(2)(G):
22 M.R.S.A. §1471-M(2)(D)

EFFECTIVE DATE:
January 1, 1988

AMENDED:
October 2, 1996

EFFECTIVE DATE (ELECTRONIC CONVERSION):
March 1, 1997

AMENDED:
September 22, 1998 - also converted to MS Word
January 4, 2005 – filing 2004-603 affecting Section 3.B.II.(iii)
January 1, 2010 by request of agency in filing 2009-252
June 12, 2013 – filing 2013-135 (Emergency major substantive)

CORRECTIONS:
February, 2014 - formatting

AMENDED:
September 11, 2014 – Section 6, filing 2014-164
May 24, 2015 – filing 2015-075 (Final adoption, major substantive)

Melissa Graffam - Re: Please Support the Portland Protectors Ordinance

From: Dave Marshall <marshalldistrict2@gmail.com>
To: Michelle Smith <mainebelle@gmail.com>
Date: 10/22/2015 8:44 PM
Subject: Re: Please Support the Portland Protectors Ordinance
CC: Jon Hinck <jhinck@portlandmaine.gov>, Justin Costa <jcosta@portlandmaine...>

Thanks Michelle,

I've copied staff on the reply so your comments can be added to the public record. We appreciate hearing your thoughtful position.

On Oct 21, 2015 8:52 AM, "Michelle Smith" <mainebelle@gmail.com> wrote:

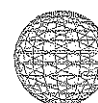
Dear Members of the Portland Sustainability Subcommittee,

I live in Portland (District 2) and wanted to ask you to support the Portland Protectors Ordinance that you are currently considering. I have huge concerns about the health and environmental impacts of pesticide use and encourage you to pass the ordinance.

I have 2 young children who play outside in our neighborhood. We do not use pesticides, but my neighbors on both sides and across the street do and I often feel like an island surrounded by toxic chemicals. We all have a right to live in an environment that is free from harmful chemicals.

Many thanks for your time,

Michelle Smith
83 Bradley Street
mainebelle@gmail.com
[\(207\) 838-0511](tel:(207)838-0511)



RESEARCH

Open Access

Municipal bylaw to reduce cosmetic/non-essential pesticide use on household lawns - a policy implementation evaluation

Donald C Cole^{1*}, Loren Vanderlinden^{2,1}, Jessica Leah¹, Rich Whate², Carol Mee², Monica Bienefeld³, Susitha Wanigaratne¹ and Monica Campbell^{2,1}

Abstract

Background: Pesticide use on urban lawns and gardens contributes to environmental contamination and human exposure. Municipal policies to restrict use and educate households on viable alternatives deserve study. We describe the development and implementation of a cosmetic/non-essential pesticide bylaw by a municipal health department in Toronto, Ontario, Canada and assess changes in resident practices associated with bylaw implementation.

Methods: Implementation indicators built on a logic model and were elaborated through key informant interviews. Bylaw impacts on awareness and practice changes were documented through telephone surveys administered seasonally pre, during and post implementation (2003-2008). Multivariable logistic regression models assessed associations of demographic variables and gardening season with respondent awareness and practices.

Results: Implementation indicators documented multiple municipal health department activities and public involvement in complaints from commencement of the educational phase. During the enforcement phases only 40 warning letters and 7 convictions were needed. The number of lawn care companies increased. Among survey respondents, awareness of the bylaw and the Natural Lawn campaign reached 69% and 76% respectively by 2008. Substantial decreases in the proportion of households applying pesticides (25 to 11%) or hiring lawn care companies for application (15 to 5%) occurred. Parallel absolute increases in use of natural lawn care methods occurred among households themselves (21%) and companies they contracted (7%).

Conclusions: Bylaws or ordinances implemented through education and enforcement are a viable policy option for reducing urban cosmetic pesticide use.

Background

Growing concern has been expressed by environmental scientists, health researchers, clinicians, and the public about the widespread use of pesticides for lawn and garden applications regarded as "non-essential" i.e. not related to the growing of food, or "cosmetic" i.e. for aesthetic appearances only. These uses contribute to broad exposure to these chemicals as documented by environmental scientists in pesticide run-off in surface waters [1,2] and contamination of groundwater intended for

drinking [3]. Human exposure studies have found pesticides among other household exposures [4] and documented pesticide residues associated with pesticide use in homes [5] and on lawns [6]. Potential effects of widespread exposures to pregnant women or children in urban settings are a particular concern [7].

Health researchers have made links between household pesticide use and children's illnesses [7], including cancer [8,9] and developmental impacts [10] from perinatal exposure. Although epidemiological studies are often limited in their ability to interpret cause or ascribe increased risks to specific pesticides, the evidence has been judged to be sufficient to prompt applications of precaution in legislation and regulation to address

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children's particular vulnerability to pesticides at both national [11,12] and state [13] levels.

Cosmetic pesticide use behaviour is governed by a complex mixture of social and environmental factors, and may be difficult to influence at an individual level [14]. Intensive consumer marketing of the ideal of "the perfect lawn" and of the pesticides needed to achieve it have fostered deeply-entrenched behaviours, neighborhood norms and even municipal ordinances requiring certain standards of lawn and garden care [15]. US surveys have found between one half and three quarters of households use pesticides and/or fertilizers outdoors [16,17] to create and maintain these outdoor spaces according to expectations, while in Canadian surveys prior to bylaw (ordinance) activity, approximately one third to one half of homeowners maintaining lawns and gardens reported using pesticides [18]. Similarly, many lawn care and landscaping companies retained in urban and suburban areas apply pesticides routinely as part of their service packages offered to clients to maintain weed- and insect-free lawns.

In light of the complex array of determinants of householder use of pesticides on lawns, jurisdictional efforts have often begun with programs to reduce the non-essential use of pesticides on public lands (i.e. areas under the direct control of government). For example, between 1995 and 2002 Danish municipalities, with support from the national government, achieved a remarkable reduction of 78% in the tonnes of active ingredients applied in public areas [19]. In a 2001 survey of 448 Ontario municipalities, more than one third did not use pesticides and nearly all had taken steps to substantially reduce or minimize pesticide use on public lands in the previous decade [20]. Approaches taken by nine jurisdictions in the USA, Canada and Europe to reduce residential pesticide use either by households or hired lawn care companies were reviewed by the Canadian Centre for Pollution Prevention in 2004 [21]. Reductions in pesticide use were estimated based on a combination of qualitative and quantitative data, and ranged from marginal (< 10%) to high (> 50%). However, the authors cautioned that "none of the communities had as strong and reliable data as [they] would have liked".

Municipal initiatives to reduce both public and private pesticide use through programs and policies are population-level health interventions that attempt to reduce health risks by changing the social, economic and/or environmental contexts contributing to those risks [22]. Evaluation of municipal initiatives to reduce pesticide use is part of the growing field of population health intervention research in which the ways they bring about change, the value of the interventions, and their effectiveness are all examined.

This paper describes a case where a systematic policy exploration, subsequent bylaw enactment, public education process and enforcement were led by the public health department of a metropolitan North American municipality. In terms of stance, several co-authors have been active participant-observers throughout the process as staff of the health department (more "insiders") while others connected with the university have been involved primarily in evaluation (more "outsiders"). We aimed to document indicators of the policy implementation, which combined both environmental health protection and health promotion components. Our specific research question was "To what extent did resident attitudes and practices change during pesticide bylaw implementation, controlling for demographic and location characteristics?"

Methods

Policy & Program Development

Setting

Toronto is Canada's largest city and the province of Ontario's capital city. It has a population of approximately 2.5 million people, of which 25% is less than 20 years old, and 20% older than 60 [23]. About half of Toronto's population was born outside of Canada. Just under 50% report a mother tongue other than English or French (the official languages). Income is distributed unevenly, and disparities between rich and poor are growing.

Administratively, the current City of Toronto was created in 1998 by the amalgamation of six former municipalities: the mostly "urban" former city of Toronto; three more "suburban" municipalities (Etobicoke, Scarborough, and North York), and two municipalities with a mix of urban and suburban areas (East York and York) [24]. The only remaining agriculturally zoned areas are in Etobicoke, North York and Scarborough, although small scale growing of fruits and vegetables in home gardens and community garden plots does occur over the summer months in all former municipalities. Visible private and public space is dominated by pavement and grass/lawn coverage on which, historically, the majority of pesticides have been applied.

Public health matters are handled by Toronto Public Health (TPH) under the direction of the Toronto Board of Health (BOH). The BOH is made up of elected officials, citizen and school board representatives, with the Medical Officer of Health (MOH) as the Executive Officer. It sets public health policy and advises City Council, Toronto's main governing and legislative body.

Impetus

In Toronto, reductions in pesticide use on public spaces began in the 1980s. Spurred on by concerns of both parents' associations and TPH staff, the Toronto Boards of

Education discontinued pesticide spraying on school properties. With the support of environmental organizations (led by the Toronto Environmental Alliance), municipal unions, and staff from multiple City divisions, Toronto City Council adopted the MOH's recommendation in 1998 to restrict pesticide use on all City property. A 97% reduction of herbicide use on general parklands, sports fields and road sides was achieved by 2001 [25].

In 2001, the Supreme Court of Canada upheld the right of a municipality, *Hudson Quebec*, to restrict pesticide use [26], observing that a 'general enabling clause' in the relevant provincial legislation gave municipalities in Quebec the ability to make bylaws related to health and general welfare. The Ontario *Municipal Act, 2001* granted municipalities general powers to pass bylaws regulating health and safety concerns when the provincial government does not have legislation governing the activity [27]. Following the Supreme Court of Canada decision, the federal Pest Management Regulatory Agency has also acknowledged the role of municipalities in regulating pesticide use by citizens.

In this permissive federal and provincial context, active municipal councilors championed consideration of a bylaw, the Canadian equivalent to an ordinance. Pressure also came from environmental and health groups, e.g. Toronto Environmental Alliance, the Ontario College of Family Physicians and the Canadian Environmental Law Association. The BOH asked TPH to prepare a document that would generate public discussion on the development and feasibility of various strategies to reduce pesticide use in Toronto and inform policy development.

TPH staff reviewed and synthesized the evidence on potential adverse health effects of lawn and garden pesticides [28]. Based on their findings, the resultant report argued for precautionary actions and for limiting unnecessary uses of commonly used pesticides. In addition, TPH incorporated information from a 2000 telephone survey regarding Toronto residents' awareness about, uses of and attitudes towards lawn pesticides [29] and a 2002 public opinion poll that gauged support for different options to reduce pesticide use [30]. Whether they used pesticides or not, over three quarters of respondents to the poll supported restrictions on pesticides and welcomed information that would help them use safer alternatives.

Generation of policy options

TPH incorporated information from an environmental scan of initiatives in other jurisdictions into a policy document [31] with four options: A) public education only, as carried out in Seattle, King County [32]; B) voluntary compliance approach, as in most recycling programs; C) bylaw (all properties), such as Oregon

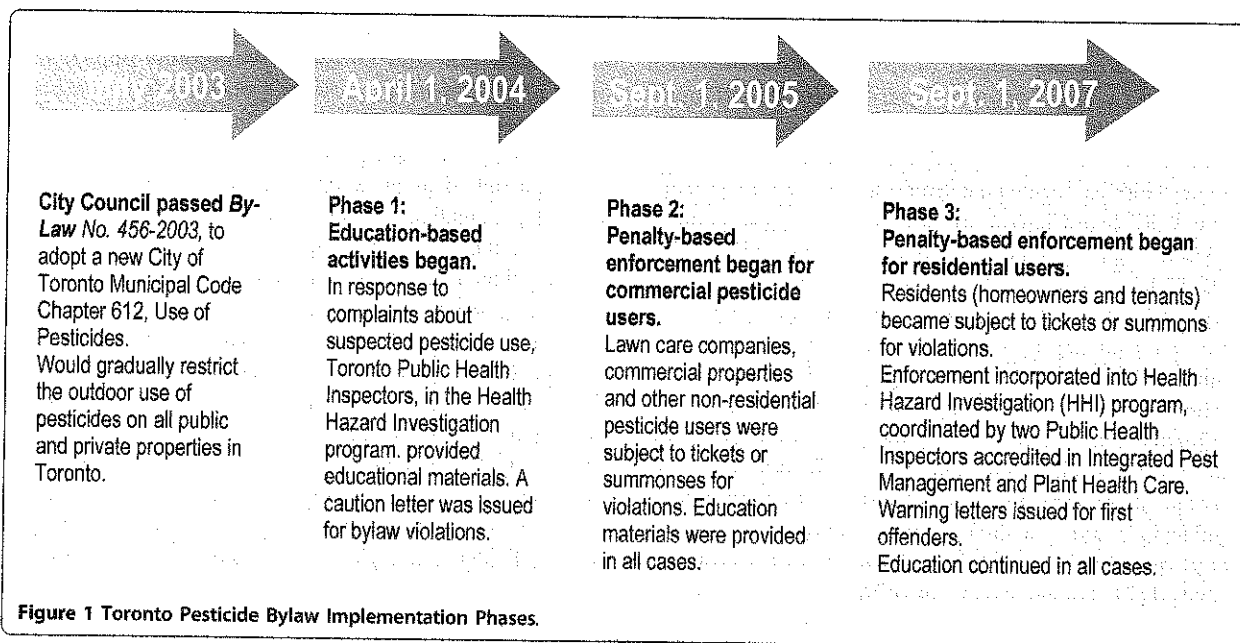
state's Pesticide Tracking Law, also called a "right-to-know" Law [33] and D) bylaw (vulnerable populations only) as in Washington State's children's law around notification of pesticide spraying in schools [34] or New York's Neighbor Notification Law [35].

TPH retained external consultants to undertake a stakeholder consultation on these options in early 2002. They conducted a workshop which brought together 65 stakeholders from pesticide manufacturing companies, lawn care companies, golf course associations, community garden groups, regional conservation authorities, environmental non-governmental organizations, health care provider organizations, school boards, ratepayer groups and governments (provincial Ministry of the Environment, Environment Canada). Workshop results informed six evening public meetings held across the city in the spring of 2002. Approximately 400 people signed in at the meetings and engaged in lively, small group discussions moderated by professional facilitators. A follow-up stakeholder meeting examined the key challenges/barriers the City would face with either a voluntary industry-led initiative or some type of bylaw. Upon consideration of the consultation report, the BOH recommended that Toronto adopt a pesticide bylaw to best protect public health [36].

Policy enactment & Program design

In May 2003, Toronto City Council passed a bylaw that "restricts the outdoor use of pesticides on all public and private properties in Toronto." It applied to anyone who might use pesticides outdoors, including homeowners, renters, lawn care companies, golf courses and cemeteries [37]. Pesticides composed of specific low-risk active ingredients such as soaps or oils, biologicals (such as nematodes) or acetic acid, among others, were exempted from the bylaw and had no municipal restrictions on their use (though federal authorities do place some use restrictions). In addition, certain uses of restricted pesticides were permitted under the bylaw: control of pests which infested property or uses related to health protection. Note, the pesticide bylaw did not govern the selling or buying of pesticides, as this falls under provincial jurisdiction. Crop Life Canada, a plant science industry trade association, challenged the City of Toronto's bylaw in court but their case was rejected by successive provincial and federal courts [38,39].

City Council recognized the need to limit commercial difficulties for lawncare and gardening businesses and to support residents in changing their long-standing methods for lawn and garden care. While a visible enforcement presence in the community was deemed critical to motivate behaviour change among both lawncare professionals and residents, the enforcement strategy was phased-in from 2004 to 2007 (Figure 1), granting time for those accustomed to using pesticides to learn about



the restrictions and to adopt alternative methods for lawn and garden care.

A pre-bylaw education program promoting natural lawn and garden care methods such as aerating the lawn, leaving grass clippings on the lawn, spreading organic fertilizers like compost, and applying mulch in garden beds and around trees [40], which can prevent pest problems and minimize the need for pesticides and chemical fertilizers, was substantially expanded. Other City divisions joined and supported the outreach campaigns. For example, Toronto Water contributed funds for advertisements through their drinking water campaign in 2003 and put a reminder in water bills. In keeping with existing evidence on effectiveness of environmental health awareness programs, traditional education/health promotion activities were complemented with more intensive interventions using multiple methods and settings [41]. TPH's education campaign aimed for variety and adaptability, delivering a combination of simple tips and more comprehensive advice, to both residents and commercial users; information through various media, in stores and in several languages and reminders throughout the gardening season to influence key decision points, such as what to do or purchase in spring and fall for a healthy lawn or garden (Table 1).

Initial implementation costs projected for the 2004 season [42] were approximately CDN\$220K covering seasonal staff time for both bylaw and education work, another CDN\$150K for advertising and another CDN\$70K for workshops, expert consultation and other expenses (total CDN\$450K or approximately US\$425K).

Implementation Indicator Selection

To inform monitoring of bylaw implementation, we developed a logic model to lay out in diagrammatic form how the policy was intended to produce results and achieve an overall goal [see Figure 2]. Our logic model identified education and enforcement as two key components, outlined activities for each of these components, and predicted short- and medium-term results.

We also supported a structured literature review to learn from other experiences in documenting household pesticide use practices and evaluating initiatives to reduce such use [14]. Building on this, we interviewed 14 key informants from a wide range of sectors as to potential indicators for evaluating bylaw implementation. The following five potential indicator domains emerged from the literature review and key informants: 1) Enforcement/Legal; 2) Education and Outreach activities, and associated community responses; 3) Economic; 4) Environmental testing; and 5) Medical/Public Health, including urine bio-monitoring and clinical visits.

Data on Enforcement/legal (1) and Education/outreach implementation indicators (2) were most readily available as TPH staff implemented the program. TPH tracks bylaw complaints and the details of complaint investigations through its Toronto Healthy Environments Information System (THEIS) database. TPH also tracked activities relevant to its education and outreach activities (as outlined in Table 1).

The potential economic impacts of a bylaw were an important concern expressed by key informants from landscaping and lawn care companies. Since actual sales data on pesticides or services were not available, we

Table 1 Public Education and Outreach Campaign

Means by which particular audiences were reached with appropriate information:

Advertising	in spring and fall - when people are thinking most about their lawns and gardens - served to remind residents of the bylaw, to balance marketing of traditional pesticides, and to support community acceptance of natural lawn care. In collaboration with Toronto Water and Parks, Forestry and Recreation, 300-500 advertisements were created and placed in major newspapers, community and ethno-cultural newspapers, City guides and newsletters, family and lifestyle magazines, transit shelters and on recycling bins [71].
City of Toronto website [72]	had the text of the bylaw, answered frequently-asked questions, included guidance for professional users, provided complaint forms, and made links to relevant information from other City divisions and community organizations. Given the ethnic diversity of Toronto, some material appeared in the City's most commonly spoken non-English languages (French, Spanish, Italian, Portuguese, Russian, Tamil, Chinese and Farsi).
Toronto Health Connection	staff responded to public telephone inquiries, processed complaints, sent educational material and provided basic advice on natural lawn care.
Brochures, fact sheets and lawn signs	were designed to appeal to residents at all stages of awareness and activity. They contained general information, lawn care and gardening tips, information on how to prevent and deal with specific pest problems; bylaw information; questions to ask a lawn-care company, and information about the lower risk pest control products with no restrictions on use.
Information in stores	as both restricted and exempted pesticides remained available for purchase and residents mistakenly assumed that products for sale were "approved" by the City. In consultation with retailers, a "Go Natural" in-store education program was launched in 2005. Go Natural brochures, tear-off sheets, staff aprons, posters and banners were voluntarily posted on store shelves or at cash registers and directed consumers to lower-risk products for certain lawn or garden problems.
Regular communication	with professional stakeholders, including landscapers, lawn care companies, arborists and other horticultural professionals to support compliance and their transition to sustainable pesticide reductions.
Community partnerships	included 16 environmental and cultural organizations funded to deliver innovative outreach such as workshops, garden tours and radio shows in eight languages. Toronto Public Health also collaborated with academic and community partners to identify communication barriers and explore opportunities to improve multicultural outreach [54].
Presentations	by City staff included expert advice through health promotion consultants, Public Health Inspectors, Parks, Forestry and Recreation staff and the Toronto Environmental Volunteers.
Public events	included both small community gatherings and large events such as Toronto's Community Environment Days, the Canadian National Exhibition, Canada Blooms, and the Toronto Renovation Forum.

used data on companies in business available from Statistics Canada [(Business Register, Canadian Business Patterns (1998-2005) & (2001-2006)]. These provided a rough indicator of potential economic impacts before and during bylaw implementation (3).

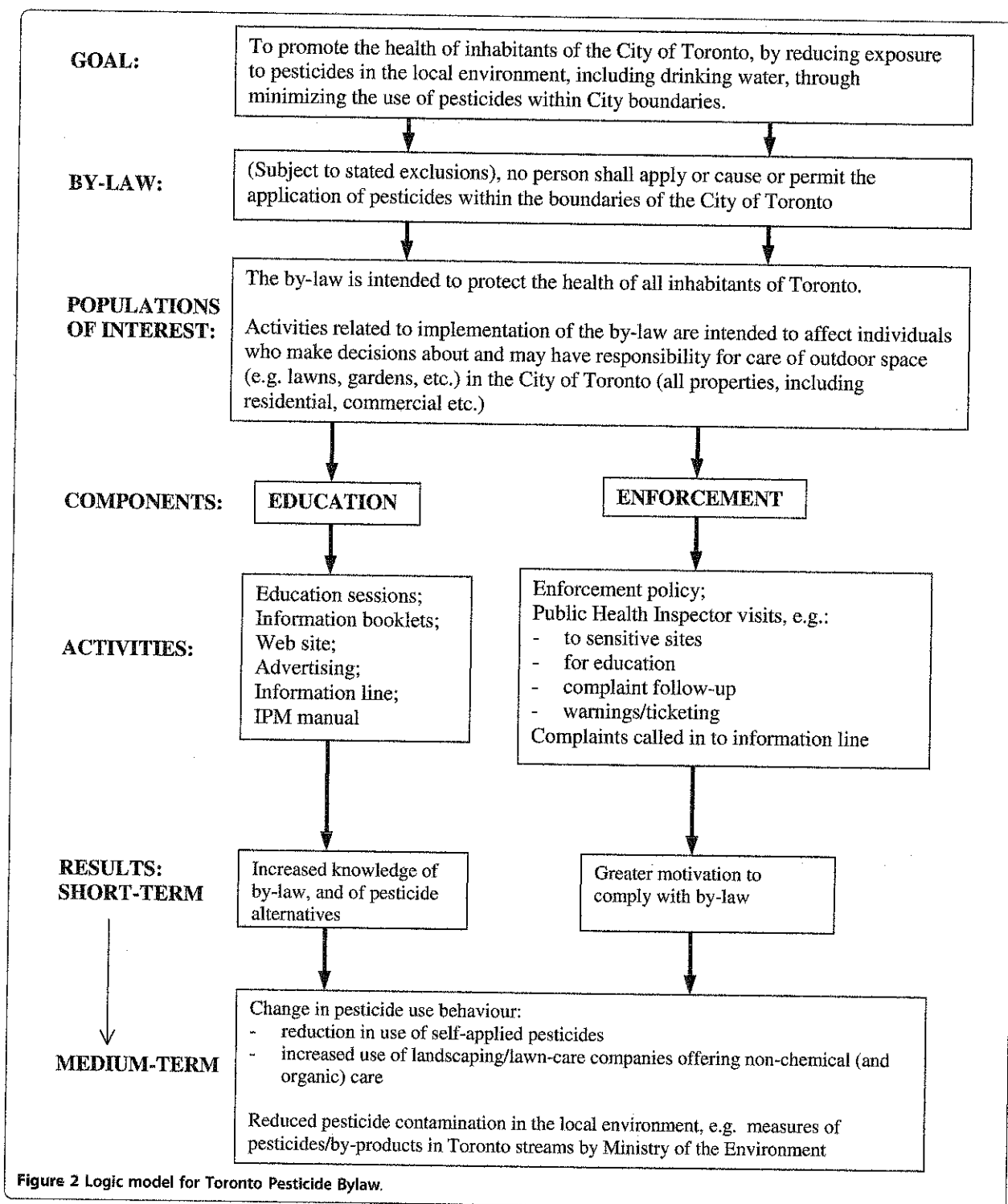
Environment Canada, Ontario Ministry of Environment and Toronto Works and Emergency Services colleagues had done some short-term surface water testing from 1998 to 2000, particularly during high run-off events (4) [43]. Unfortunately, the costs of systematic, regular, long-term surface water monitoring were unsupported at the time the bylaw was implemented. Further, we were unable to implement indicators for domain 5 for several reasons. For bio-monitoring, we were concerned that intra- and inter-individual variation could potentially swamp an exposure reduction effect, the substantial costs involved (minimally an estimated \$125K annually over at least five years) were beyond municipal resources, and ethical concerns had been raised during the evaluation of environmental health interventions [44,45]. We explored clinical data systems but those available were incomplete, focused on hospital visits only, and did not adequately identify pesticide exposure in routinely coded data, unlike pesticide

exposure incident reporting systems specifically designed for such purposes which have proved very useful in evaluating reductions in other jurisdictions [46].

Repeat Surveys

Design

To track community responses via resident awareness and behaviour over time (domain 2), we turned to the Rapid Risk Factor Surveillance System (RRFSS), a set of ongoing monthly surveys designed to monitor community trends in health risk behaviours among the Ontario population. RRFSS surveys are administered independently by the Institute for Social Research, York University, and consist of questions organized into core and optional modules [47]. TPH led development of optional "pesticides and lawns", "pesticide bylaw" and "pesticide reduction education" modules that were conducted on a monthly basis from 2003 to 2008. The repeated surveys were an appropriate evaluation tool given the phased in approach of pesticide bylaw implementation (See Figure 1). This design approximates the one-group pretest-posttest design most frequently used to evaluate the impact of health programs, though with more 'during' measures, given the phased implementation [48].



Household selection was via random digit dialing procedures. A phone number was called repeatedly until either the survey was completed or the maximum number of 14 calls had been made, at which time the

number was considered a 'dead' sample. Within households, the adult with the most recent birthday was selected with no substitutions of more willing household members. Attempts were made to encourage those

individuals who initially refused to participate by calling them at least once after they first refused. Consent to participate was verbal, with no address, name or other identifying information collected (i.e. anonymous) as approved by York University's Research Ethics Board, Human Participants Review Subcommittee for generation and use of RRFSS data.

All interviews were completed in English, using Computer-Assisted Telephone Interviewing techniques, which greatly assists in expediting the data editing and cleaning process because logical and quality control checks can be programmed into the questionnaire design [49]. Respondents were asked about either the current (for surveys conducted from April to October) or most recent past (for surveys conducted from October to following spring) gardening seasons. Although this may create some uncertainty in assignment of the relevant gardening season, it was required when surveys were administered in winter months when no gardening was occurring. RRFSS data had indicated that about 50% of households in Toronto had lawns. Because questions about pesticide use were only asked of this subsample of residents, an oversample was implemented in some seasons to ensure a subsample of sufficient size to allow for more detailed analyses of the data.

Socio-demographic variables available included: respondent's gender, pre-tax household income (twelve categories), respondent's highest level of education (four categories from did not graduate from high school to college or university degree) and household location within the City (as defined by the household's municipality prior to amalgamation). Missing data, in addition to item refusals or "don't know", varied from 0 (gender) to 27% (household income). Household size, asked in some years, was on average 2 adults, permitting the estimation of a low income cut-off (LICO) as CDN\$27,601 [50]. As this fell towards the upper limit of an income category on the survey (\$20,000 to \$29,999), all respondents in this category or the lowest (< 20,000) were designated as below the LICO.

For bylaw awareness, all respondents from 2005 on were asked "Some communities have bylaws that limit the outdoor use of pesticides, some are thinking about it and others do not. Do you think that the City of Toronto currently has a bylaw that limits the outdoor use of pesticides?" Further, respondents were asked "Have you seen or heard anything about the Naturally Green/Simple and Effective Lawn Care Campaign in your community? ...includes lawn signs, brochures, and ads in the newspaper which encourage people to avoid pesticides and try pesticide free methods." Responses (Yes/No) became the pesticide bylaw and Natural Lawn Care Campaign awareness dependent variables. Additional questions were asked to understand reasons for

reducing pesticide use, using more natural methods and obtaining information on each of these, particularly among the 2005 and 2006 oversamples [51].

For household practices, across all years, respondents were first asked "Does your home have a lawn that you or someone else in your household is taking care of?" If yes, then "Did you or someone else in your household hire or pay a lawn care company to treat your lawn?" and, if yes, then "Did the lawn care company use any pesticides on your lawn to kill weeds or insects?" and "Did they offer to use any natural lawn care/pesticide-free methods such as aeration, over-seeding, hand weeding, or products such as corn gluten?" Similar questions were also asked of respondents with a lawn about applications by "you or someone else in your household" (except for natural lawn care methods in the first year of interest). These became the practices or use dependent variables.

Analysis

Data distributions were analyzed with STATA/IC statistical software version 11.0 (2009). Individual level variables (gender, education, pesticide bylaw awareness and Natural Lawn Care Campaign awareness) were weighted to account for the unequal probabilities of selection of one-adult households [52]. Two weights were created for gender and education (gardening 2003-2008), and for pesticide bylaw and Natural Lawn Care Campaign awareness (gardening season 2005-2008), to account for the different time periods in which the questions were asked. Oversamples were given separate values for gardening years, as demographic characteristics of these oversamples varied systematically from regular samples; i.e., more women, greater education, and different location distribution. For key practice variables, confidence intervals were calculated on the first and last year proportions. Bivariate associations were assessed with chi-square statistics.

We then constructed multivariable logistic models with gardening year as the primary independent variable of interest and demographic variables as covariate independent variables (to control for differences across years), with one awareness or use variable as the dependent variable in each model. As associations were observed between awareness variables and between them and gardening year (i.e. increased awareness as bylaw enforcement and education programs rolled out), variable selection was required. The latter examined associations between gender, level of education, income, location, and gardening year as independent variables and respondent awareness or household practice dependent variables. Given the mix of individual and household variables, we conducted sensitivity analyses to examine the effect of using weights that account for individual-level variables versus household variables, and

weights that account for different time periods in which the questions were asked. These weights are available from authors upon request. Eventually we settled on application of individual weights as the most inclusive option. Changes in adjusted odds ratios (OR) with 95% confidence intervals were displayed graphically.

Results

Implementation indicators

Enforcement/legal - Public Health Inspectors with special training in integrated pest management/plant health care led an enforcement strategy that included proactive visits to schools, golf courses and other properties, participation in educational events in the community and at garden centres, and in-person response to over 3,000 complaints of suspected violations, most occurring early on (see complaint investigations, Table 2). From initiation in 2004 to the first full season of enforcement on lawn care companies and commercial properties (2006), complaints decreased over 80 per cent. This decrease and the low number of convictions required suggest that enforcement and education messages reached much of the professional sector and most came into compliance [53].

Education/outreach - As can be seen in Table 2, the effort to make residents aware was substantial. In addition to those methods listed, city staff conducted 291 proactive information visits to sensitive sites, such as child care centers and hospitals, and all public and private golf courses and bowling greens. Informal feedback

from the community helped identify the need for expert resources on plants and gardens not just lawns. TPH responded by partnering with the Toronto Master Gardeners to produce a series of fact sheets on natural care of flowers and vegetable gardens and promote the information via the internet, during lectures, community events and a telephone information line. Community feedback also resulted in new retail materials, information for the lawn care sector, and particular efforts with ethno-cultural partners [54].

Economic - From 2001 to 2006, the number of landscaping and lawn care sector businesses located in the City of Toronto grew each year, with an overall 30 per cent increase during the period, similar to the increases in companies located anywhere in the Greater Toronto Area (36%) and across Ontario (32%) [53].

Repeat Survey findings

Response rates across the six years of interest (2003-2008) ranged from 58% (in 2005) to 50% (in 2007). Explicit oversamples of those with lawns occurred for the 2005 (n = 355) and 2006 (n = 179) gardening seasons, resulting in an overall sample of 4,901 respondents.

As can be seen in Table 3, over half of households (55.6%) reported having or caring for a lawn, with greater proportions in the oversampled garden seasons (> 60%) in keeping with intentional selection in the oversamples (e.g. in 2005, 541/1085 or 49.9% in regular sample and 100% in oversample). The proportion hiring

Table 2 Relevant indicators of Toronto pesticide policy roll-out and program implementation.

Domain	Indicator	Gardening Season				
		2004	2005	2006	2007	2008
Enforcement/legal	Bylaw complaint investigations	1672	1118	294	74	127*
	Warning letters issued	NA	6	28	6	0
	Convictions	NA	3	0	1	3
Education & Outreach	Advertisements placed	353	503	335	850**	850
	Website - Pages of content	50	197	230	No info	No info
	Traffic/month	4,754	7,999	12,000		
	General information materials (postcard, brochure, pamphlet)	40,000	20,356	92,949	89,250	> 75,000
	Technical manual	435	892	482	45	25
	Plastic "pesticide" free lawn signs	3000	1646	300	Discontinued	NA
	Telephone inquiries	709	588	434	174	318
	Presentations at events	53	74	74	32	20
	Go Natural retail participation	NA	122 stores 83,343 materials	122 stores 98,000 materials	113 stores 53,334 materials	145 30,627 materials
	Fact sheets on natural gardening	NA	NA	> 2500	> 2500	> 2500

*Several lawn care companies introduced a new lower-risk pesticide in 2008, which triggered an increase in complaints, though the pesticide was compliant with the bylaw.

** In 2007 and 2008, TPH initiated an extensive month-long radio ad campaign, which significantly increased the number of ads.
NA = Not applicable

Table 3 Respondent* and household^ characteristics, by gardening season (n, %) (Rapid Risk Factor Surveillance Survey, Toronto)

Characteristics	Gardening Season						Totals (N = 4901)
	2003 (N = 608)	2004 (N = 609)	2005† (N = 1440)	2006‡ (N = 777)	2007 (N = 620)	2008 (N = 847)	
Gender* (weighted counts, wgt'd %)	(n = 608)	(n = 607)	(n = 1453)	(n = 795)	(n = 614)	(n = 825)	
Women	316 (52.0%)	353 (58.2%)	795 (54.7%)	459 (57.7%)	344 (56.0%)	457 (55.3%)	2723 (55.6%)
Men	292 (48.0%)	253 (41.8%)	658 (45.3%)	336 (42.3%)	270 (44.0%)	368 (44.7%)	2178 (44.4%)
Education* (wgt'd counts, wgt'd %)	(n = 608)	(n = 607)	(n = 1453)	(n = 795)	(n = 614)	(n = 825)	
< High school	62 (10.2%)	82 (13.5%)	130 (9.0%)	77 (9.7%)	45 (7.3%)	63 (7.7%)	459 (9.4%)
High school	118 (19.5%)	111 (18.2%)	269 (18.5%)	138 (17.4%)	130 (21.2%)	182 (22.1%)	947 (19.3%)
Some post-2ndy	58 (9.6%)	60 (9.9%)	124 (8.6%)	76 (9.6%)	40 (6.5%)	75 (9.1%)	434 (8.9%)
Completed post-2ndy	361 (59.4%)	347 (57.2%)	904 (62.2%)	496 (62.3%)	394 (64.1%)	494 (59.8%)	2995 (61.1%)
Missing, don't know, refused	9 (1.4%)	7 (1.2%)	26 (1.7%)	8 (1.0%)	5 (0.9%)	11 (1.3%)	66 (1.3%)
Income^†							
< low income cutoff	122 (20.1%)	127 (20.9%)	201 (14.0%)	121 (15.6%)	91 (14.7%)	137 (16.2%)	799 (16.3%)
≥ > low income cutoff	357 (58.7%)	344 (56.5%)	842 (58.5%)	433 (55.7%)	336 (54.2%)	460 (54.3%)	2772 (56.6%)
Missing, don't know, refused	129 (21.2%)	138 (22.7%)	397 (27.8%)	223 (28.7%)	193 (31.1%)	250 (29.5%)	1330 (27.1%)
Municipality^							
East York	36 (5.9%)	33 (5.4%)	98 (6.8%)	60 (7.7%)	40 (6.5%)	64 (7.6%)	331 (6.8%)
Etobicoke	98 (16.1%)	76 (12.5%)	190 (13.2%)	98 (12.6%)	86 (13.9%)	142 (16.8%)	690 (14.1%)
North York	157 (25.8%)	155 (25.5%)	340 (23.6%)	172 (22.1%)	151 (24.4%)	189 (22.3%)	1164 (23.8%)
Old City of Toronto	168 (27.6%)	183 (30.0%)	388 (26.9%)	215 (27.7%)	174 (28.1%)	241 (28.5%)	1369 (27.9%)
Scarborough	116 (19.1%)	118 (19.4%)	333 (23.1%)	175 (22.5%)	133 (21.5%)	168 (19.8%)	1043 (21.3%)
York	29 (4.8%)	32 (5.3%)	70 (4.9%)	48 (6.2%)	27 (4.4%)	34 (4.0%)	240 (4.9%)
Other	1 (0.2%)	1 (0.2%)	2 (0.1%)	1 (0.1%)	3 (0.5%)	0 (0.0%)	8 (0.2%)
Missing, don't know, refused	3 (0.5%)	11 (1.8%)	19 (1.3%)	8 (1.0%)	6 (1.0%)	9 (1.1%)	56 (1.1%)
Had a lawn^							
Yes	333 (54.8%)	289 (47.5%)	896 (62.2%)	479 (61.7%)	308 (49.7%)	421 (49.7%)	2726 (55.6%)
No	265 (43.6%)	312 (51.2%)	529 (36.7%)	294 (37.8%)	308 (49.7%)	421 (49.7%)	2129 (43.4%)
Missing, don't know, refused	10 (1.6%)	8 (1.3%)	15 (1.0%)	4 (0.5%)	4 (0.6%)	4 (0.6%)	46 (0.9%)
Hired a lawn care company^ [among those with lawns]							
Yes	81 (24.3%)	77 (26.6%)	193 (21.5%)	97 (20.3%)	72 (23.4%)	98 (23.3%)	618 (22.7%)
No	248 (74.5%)	202 (69.9%)	693 (77.3%)	376 (78.5%)	232 (75.3%)	316 (75.1%)	2067 (75.8%)
Missing, don't know, refused	4 (1.2%)	10 (3.5%)	10 (1.1%)	6 (1.3%)	4 (1.3%)	7 (1.7%)	41 (1.5%)

‡ Explicit oversamples of those with lawns occurred for the 2005 (n = 355) and 2006 (n = 179) gardening seasons

†The cut-offs are based on income before taxes for a 2 person household in a community size of 500,00 and over. Since the cut-off for a 2 person household in a community size of 500,000 and over is 27,601, a value within an income category (\$20,000 to \$29,999), all respondents within this category were designated below the LICO. All respondents within income categories > 30,000 were designated above the LICO.

lawn care companies remained relatively consistent over time (maximum 26.6% of those with lawns in 2004, minimum 20.3% in 2007, back up to 23.3% in 2008), agreeing with the business data and contrary to the fears of some lawn care spokespeople.

Across gardening seasons, the (weighted) proportion of respondents indicating awareness of the Toronto pesticide bylaw increased from 50.6% (2005) to 69.2% (2008) (Table 4). Among those with lawns, reported use of pesticides on their lawn decreased, both by a company they hired (14.7% in 2003 to 4.5% in 2008) or by a household member (24.6% in 2003 to 11.2% in 2008) with no overlap of 95% confidence intervals (Table 5). Respondent awareness of the Natural Lawn Care Campaign among those with lawns showed little change (36.8% in 2005 to 37.8% in 2008), but use of natural lawn care practices by a company they hired (4.8% in 2003 to 11.9% in 2008) or a household member (45.3% in 2004 to 66.3% in 2008) did increase (confidence intervals also non-overlapping).

Among households that indicated that they had reduced their pesticide use (data not in tables), the primary reason given was for health or environmental reasons (33.7% average), followed closely by the pesticide bylaw (23.9% average) and that simply their lawn did not require pesticides (16.3% average) [53]. While the pesticide bylaw was not the most influential factor, an upward trend (+5.1%) of citing the bylaw as the motivation was seen between gardening seasons 2006 and 2007. Among households that indicated they had changed towards increasing their use of natural lawn care methods, the primary influence was health or environmental reasons (42% average). The pesticide bylaw was cited as the reason by 20% of respondents. Among those never having used natural lawn care methods, the largest group (48.3%) reported not having much knowledge of natural lawn care practices or methods.

In bivariate analyses (Table 6), awareness of the pesticide bylaw and the Natural Lawn Care Campaign were moderately associated (Odds Ratio (OR) > 2 most seasons) so either one or the other had to be used in

multivariable models. Dependent variables showed variation by respondent gender and education, and household income and location, so were included in multivariable logistic models (table 6). Male respondents were generally more aware of the pesticide bylaw (OR 1.2) and less aware of the Natural Lawn

Campaign (OR 0.8). Though less likely to use natural lawn care methods, their households were more likely to apply pesticides. In contrast, among respondents with less than high school education who were also more aware of the pesticide bylaw, their households less commonly applied pesticides or used natural lawn care methods more often. Low income households were less aware of the Natural Lawn Care Campaign and applied these methods less commonly. Across gardening seasons, trends towards greater awareness of the pesticide bylaw and less application of pesticides remained, along with greater use of natural lawn care methods (but not awareness). The same pesticide application trends can be observed graphically (Figure 3), among the regular sample (without oversample, hence slightly different OR from table).

Discussion

Municipal Implementation

We have described an innovative approach to designing and implementing a new policy involving regulation of outdoor use of pesticides for non-essential purposes. The policy gestation over several years, the substantial efforts to engage in dialogue and debate with the public and relevant stakeholders, the mobilization of adequate TPH staff resources and the widespread dissemination of information, both about the bylaw and alternatives, reached Toronto residents. By 2008, over two-thirds of respondents reported being aware of the bylaw.

On the enforcement front, residents were active in lodging complaints, but few actual prosecutions were needed. The specialized training for health inspectors and strong enforcement presence increased awareness and likely compliance. At the same time, the complexity of governance around pesticide use, with responsibilities

Table 4 Respondent* & household^ lawn care awareness and practices, City of Toronto, 2003-2009 All households (n, %)

Lawn Care Awareness & Practices	Gardening Season						Totals (n = 4901)
	2003 (n = 608)	2004 (n = 609)	2005 (n = 1440)	2006 (n = 777)	2007 (n = 620)	2008 (n = 847)	
Aware of pesticide bylaw*†(wgtd counts, wgtd %)	NA	NA	(n = 1452)	(n = 794)	(n = 614)	(n = 825)	(n = 3684)
Yes			734 (50.6%)	520 (65.4%)	415 (67.8%)	570 (69.2%)	2239 (60.8%)
No			133 (9.2%)	80 (10.1%)	48 (7.8%)	75 (9.1%)	335 (9.1%)
Missing, Don't Know, Refused			585 (40.3%)	195 (24.5%)	151 (24.6%)	179 (21.8%)	1110 (30.1%)

† Question pestby_1 from Pesticide Awareness Module in RRFSS. Some communities have bylaws that limit the outdoor use of pesticides, some are thinking about it and others do not. Do you think that "Name of Health Unit inserted here" currently has a bylaw that limits the outdoor use of pesticides?

Table 5 Respondent* & household^ lawn care awareness and practices, City of Toronto, 2003-2009 Only households with lawns (n, %, 95% CI for key practices)

Lawn Care Awareness & Practices	Gardening Season						Totals (n = 2726)
	2003 (n = 333)	2004 (n = 289)	2005 (n = 896)	2006 (n = 479)	2007 (n = 308)	2008 (n = 421)	
Lawn care company applied pesticides^ †							
Yes	49 (14.7%, 10.9 - 18.5)	40 (13.8%)	69 (7.7%)	18 (3.8%)	9 (2.9%)	19 (4.5%, 2.5 - 6.5)	204 (7.5%)
No	18 (5.4%)	27 (9.3%)	86 (9.6%)	69 (14.4%)	52 (16.9%)	66 (15.7%)	318 (11.7%)
Missing & Not Applicable	266 (79.9%)	222 (76.8%)	741 (82.7%)	392 (81.8%)	247 (80.2%)	336 (79.8%)	2204 (80.9%)
Household member applied pesticides^‡							
Yes	82 (24.6%, 20.0 - 29.3)	58 (20.1%)	145 (16.2%)	83 (17.3%)	43 (14.0%)	47 (11.2%, 8.1 - 14.2)	458 (16.8%)
No	229 (68.8%)	205 (70.9%)	708 (79.0%)	375 (78.3%)	248 (80.5%)	350 (83.1%)	2115 (77.6%)
Missing & Not Applicable	22 (6.6%)	26 (9.0%)	43 (4.8%)	21 (4.4%)	17 (5.5%)	24 (5.7%)	153 (5.6%)
Aware of Natural Lawn Care Campaign*§(wgtd counts, wgtd%)							
Yes	NA	NA	(n = 977)	(n = 531)	(n = 344)	(n = 456)	(n = 2308)
No			359 (36.8%)	210 (39.4%)	133 (38.8%)	172 (37.8%)	875 (37.9%)
Missing, Don't Know, Refused			473 (48.4%)	300 (56.5%)	197 (57.3%)	269 (59.1%)	1239 (53.7%)
			145 (14.9%)	22 (4.1%)	14 (3.9%)	14 (3.1%)	195 (8.4%)
Lawn care company used natural lawn care methods^°							
Yes	16 (4.8%, 2.5 - 7.1)	29 (10.0%)	67 (7.5%)	49 (10.2%)	32 (10.4%)	50 (11.9%, 8.8 - 15.0)	243 (8.9%)
No	23 (6.9%)	21 (7.3%)	46 (5.1%)	19 (4.0%)	13 (4.2%)	17 (4.0%)	139 (5.1%)
Missing & Not Applicable	294 (88.3%)	239 (82.7%)	783 (87.4%)	411 (85.8%)	263 (85.4%)	354 (84.1%)	2344 (86.0%)
Household member used natural lawn care methods^¶							
Yes	NA	131 (45.3%, 39.6 - 51.1)	518 (57.8%)	290 (60.5%)	196 (63.6%)	279 (66.3%, 61.7 - 70.8)	1414 (51.9%)
No		130 (45.0%)	333 (37.2%)	163 (34.0%)	97 (31.5%)	109 (25.9%)	832 (30.5%)
Missing & Not Applicable		28 (9.7%)	45 (5.0%)	26 (5.4%)	15 (4.9%)	33 (7.8%)	480 (17.6%)

† Question pbl_3 from Pesticides and Lawns Module in RRFSS. Did the lawn care company use any pesticides on your lawn to kill weeds or insects?

‡ Question pbl_8 from Pesticides and Lawns Module in RRFSS. There are also many commercial pesticides available off the shelf, such as Roundup, Killex and Weed and Feed, for HOME AND GARDEN use. Now some questions about these types of pesticides.

If pbl_2 = 1 (if hired/paid a lawn care company) Besides the services provided by the lawn care company, so far this year*, have you or someone else in YOUR HOUSEHOLD used pesticides on your LAWN to get rid of weeds or insects?

If pbl_2 = 5 (if not hired/paid a lawn care company) So far this year*, have YOU or someone else in YOUR HOUSEHOLD used pesticides on your LAWN to get rid of weeds or insects?

§ Question ng_1 from Pesticide Campaigns Module in RRFSS. Have you seen or heard ANYTHING about the Naturally Green Campaign in your community? The campaign includes lawn signs, brochures, and ads on the radio which encourage people to avoid pesticides and try pesticide free methods.

° Question pbl_7 from Pesticides and Lawns Module in RRFSS. [PBL_6 = No] Did they (the lawn care company) use any natural lawn care/pesticide-free methods? [PBL_6 = Yes] And did they use it?

¶ Question pbl_10 from Pesticides and Lawns Module in RRFSS.

If pbl_2 = 1 (if hired/paid a lawn care company) Besides the services provided by the lawn care company, have YOU or someone else in YOUR household used pesticide-free methods such as hand weeding or used products such as corn gluten on your lawn?

If pbl_2 = 5 (if not hired/paid a lawn care company), So far this year*, have YOU or someone else in YOUR household used pesticide-free methods such as hand weeding or used products such as corn gluten on your lawn?

Table 6 Logistic regression models of variables associated with respondent awareness or household practice outcomes, weighted with individual level variable weight (Odds Ratio, [Standard Error], significant coefficients bolded)

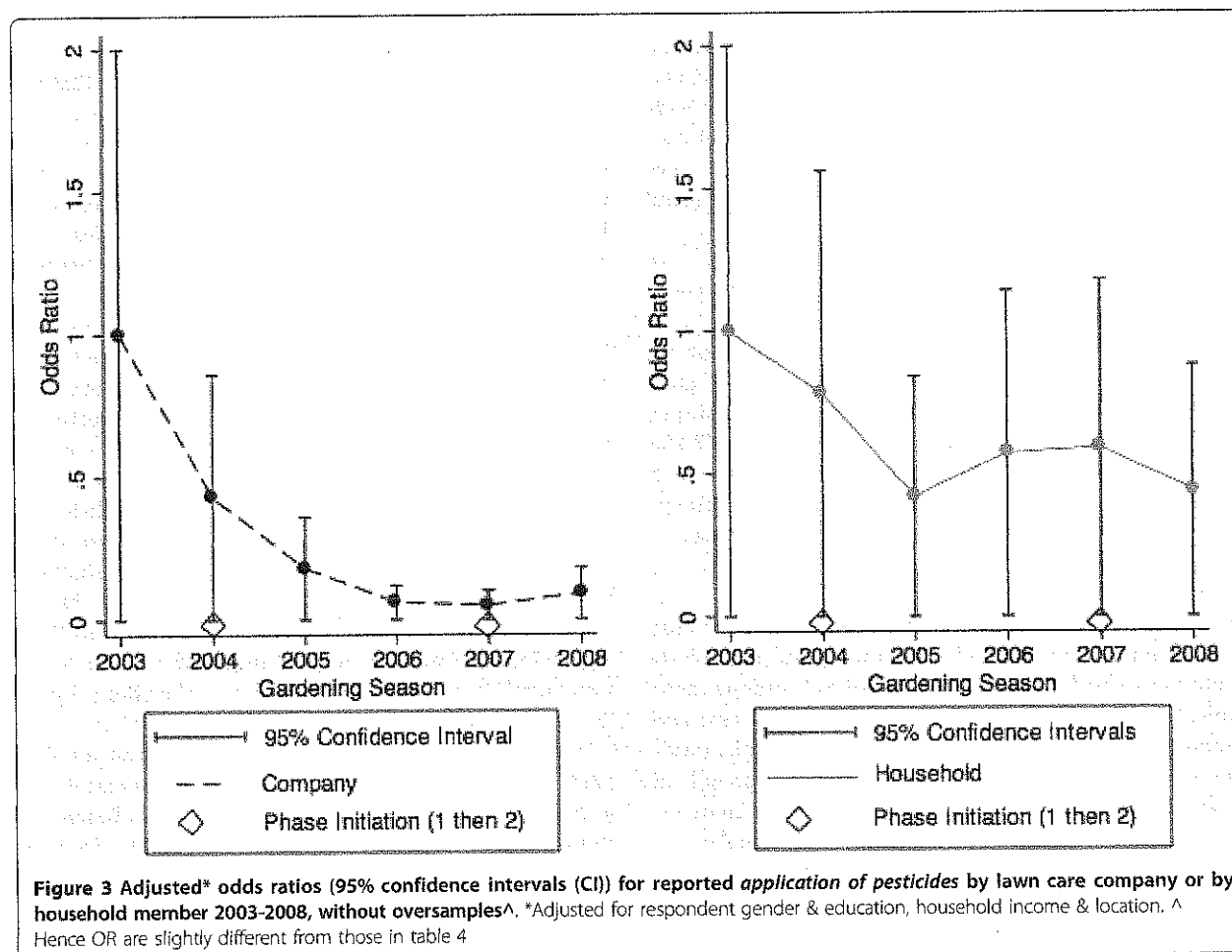
Independent variables	Dependent variable					
	Respondent aware of pesticide bylaw (n = 1804)	Lawn care company applied pesticides (n = 375)	Household member applied pesticides (n = 1863)	Respondent aware of Natural Lawn Care Campaign (n = 1804)	Lawn care company used natural lawn care methods (n = 196)	Household member used natural lawn care methods (n = 1283)
Gender (Woman referent)						
Man	1.21 [0.17]	1.67 [0.25]	1.71 [0.12]	0.85 [0.11]	0.77 [0.37]	0.75 [0.12]
Education (completed post-2ndy referent)						
< high school	1.52 [0.39]	0.75 [0.53]	0.72 [0.27]	1.02 [0.24]	0.34 [1.06]	0.52 [0.27]
high-high school		0.98 [0.35]	0.77 [0.17]	0.74 [0.15]	1.16 [0.48]	0.89 [0.16]
> high school	1.01 [0.23]	1.52 [0.46]	1.04 [0.22]	0.94 [0.20]	0.38 [0.73]	0.97 [0.24]
	1.03 [0.29]					
Household income (≥ LICO referent)						
< low income cutoff	1.12 [0.24]	0.59 [0.38]	0.80 [0.20]	0.72 [0.16]	0.26 [0.62]	0.51 [0.19]
Municipality (East York referent)						
Etobicoke	0.65 [0.36]	1.30 [0.60]	1.37 [0.30]	1.31 [0.23]	1.07 [0.79]	1.15 [0.28]
North York	0.60 [0.34]	1.65 [0.58]	1.85 [0.28]	0.94 [0.22]	1.67 [0.76]	0.60 [0.26]
Old City of Toronto		0.79 [0.62]	0.94 [0.29]	1.14 [0.21]	2.26 [0.80]	1.12 [0.26]
Scarborough	0.78 [0.34]	2.48 [0.58]	1.92 [0.28]	0.94 [0.22]	6.23 [0.78]	0.90 [0.26]
York	1.15 [0.36]	1.17 [1.32]	1.15 [0.38]	1.75 [0.30]	1.12 [1.25]	1.20 [0.36]
Other	0.42 [0.45]	NU	3.51e-05 [393.7]	1.02 [1.35]	NU	NU
	0.18 [1.40]					
Gardening period (referent year)	(2005)	(2003)	(2003)	(2005)	(2005)	(2005)
2004	NA	0.49 [0.44]	0.97 [0.23]	NA	NA	NA
2005	NA	0.21 [0.42]	0.51 [0.21]	NA	NA	NA
2005 Oversample	1.13 [0.29]	0.43 [0.46]	0.81 [0.22]	0.77 [0.20]	1.60 [0.52]	1.41 [0.19]
2006	1.08 [0.24]	0.08 [0.53]	0.59 [0.24]	1.04 [0.16]	3.99 [0.62]	1.30 [0.19]
2006 Oversample	1.81 [0.48]	0.02 [1.09]	0.71 [0.29]	0.52 [0.28]	1.44 [0.70]	2.29 [0.26]
2007	1.53 [0.27]	0.06 [0.53]	0.53 [0.24]	0.81 [0.16]	2.31 [0.56]	2.22 [0.20]
2008	1.40 [0.23]	0.10 [0.46]	0.47 [0.23]	0.68 [0.15]	5.18 [0.58]	2.01 [0.19]
Others						
Pesticide bylaw awareness	NU	NU	NU	2.53 [0.18]	NU	NU
Natural Lawn Care Campaign lawn care campaign awareness	2.55 [0.18]	NU	NU	NU	1.66 [0.36]	1.79 [0.13]

NA indicates not available in gardening season

NU indicates variable not used for the model because not appropriate as variable to be dependent variable, not included as wanted to include all seasons, or co-variation required selection between two awareness variable.

at the national (registration), provincial (classification as to uses and sale) and municipal levels, left an opening for the unsuccessful court challenge and created additional user confusion.

Overall costs for city taxpayers were reasonable: in the most intense launch year about 450K/2.5 million residents or CDN\$0.20 per resident per year, within the lower range of the expenditure ratios reported in the



review by the Canadian Centre for Pollution Prevention [21]. These were substantially lower than environmental tobacco smoke bylaw implementation and enforcement costs, where persistent conflict was greater [55,56].

Resident practice changes

In a city where households already appeared to use pesticides less than other jurisdictions (only 15% company and 25% household application versus over 50% of households applying pesticides in other Canadian jurisdictions (Ipsos Reid, 2001, unpublished), significant further reductions in pesticide application were achieved. Comparing these falls in use is difficult given the different metrics used in the limited grey literature e.g. the drop in household contracted company applications can be framed as a modest absolute difference of 10% (14.7-4.5) or as a very large proportionate drop of 69% (10.2/14.7). Similarly for householder application, an absolute difference of 13% (24.6-11.2) or a proportionate decrease of 54% (13.4/24.6). The proportionate decreases would be comparable to the largest changes

observed in the Canadian Centre for Pollution Prevention's review [21] including two other municipalities with bylaws - the very small community of Hudson, Quebec and the city of Halifax, Nova Scotia. Note that context can also influence such reductions, as comfort with pesticide use differed between rural and urban areas of Utah [57]. The absolute differences we observed would be more comparable to those achieved in Seattle and Chesapeake Bay through education and outreach alone.

However framed, we may ask why reported use did not approach zero, despite use of the suggested multiple channels in risk communication [58]. First, the bylaw permitted uses of some pesticides, which may be among those reported. Second, the continued availability of non-permitted products at stores may have led many homeowners to believe they were allowed to use them. Licensing of products is a federal mandate and the actual sales process a provincial one. Third, associations of the "perfect lawn" in suburban areas with higher socioeconomic status [14], the more status-conscious

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Green up Your Yard with Organic Lawn Care

Save Money and the Environment

NOFA Organic Land Care Program
a project of the
Northeast Organic Farming Association (NOFA)



The Three Take-Home Points

1. Work with nature
2. Feed the soil
3. Read the label



Workshop Outline

- Who are we?
- What is Organic Land Care? *(Work with nature)*
- Why do organic landscaping? *(Feed the label)*
- How to do organic landscaping. *(Feed the soil)*
- Where to find more resources...
- Q&A



Local and Organic Since 1982

CT NOFA

Cultivating an Organic Connecticut since 1982

CT NOFA also provides education for homeowners and professionals by

- > Promoting methods of gardening and land care that respect biodiversity, soil, water, air and the needs of future generations.
- > Educating consumers about their power to effect positive changes through their food and land care choices.

(Work with nature)

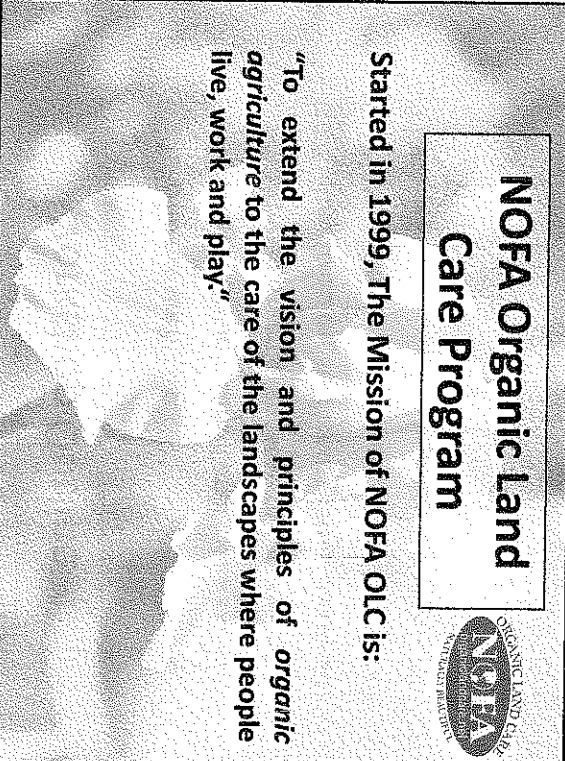




NOFA Organic Land Care Program

Started in 1999, The Mission of NOFA OLC is:

“To extend the vision and principles of organic agriculture to the care of the landscapes where people live, work and play.”





What IS NOFA Organic Land Care?

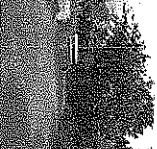
Organic land care is primarily about methods for landscaping that:

- Build healthy soils *(Feed the Soil)*
- Reduce watering and fertilizing needs *(Work with Nature)*
- Increase biodiversity
- Use local materials
- Protect water resources
- Protect health and the environment *(Feed the Label)*
- Create natural beauty



More about the NOFA Organic Land Care Program

- Written Standards for Organic Land Care adopted internationally by IFOAM
- Organic landscaping courses
- First OLC Accreditation program in US
- 505 professionals in 20 states
- Trained over 1500 students







What is NOT NOFA Organic Land Care?

Organic land care is not about replacing synthetic chemical treatments with organic substitutes. It is about:

- No synthetic pesticides or fertilizers *(Feed the Label)*
- No genetically engineered organisms
- No sewage sludge or bio-solids
- No excess watering and fertilizing
- No invasive species
- Avoid toxic materials
- No contamination of water resources
- “Do No Harm”

Why Landscape Organically?

- Avoid toxic chemicals, pollutants and invasive plants
- Protect local, regional and global environmental resources
- Easier, cheaper, and more effective in the long run
- Create lasting beauty

Federal law defines pesticides as any product with any of the following:

- Herbicides (e.g. Weed and Feed)
- Pre-emergents (e.g. Crab grass control)
- Insecticides (e.g. Grub control)
- Fungicides (e.g. for mold and mildew)
- Miticides
- Anti-microbials
- Rodenticides
- Algicides
- Repellents
- Or any chemical designed to kill, repel or mitigate any pest



What is a Pesticide?

CAUTION

Pesticide Application



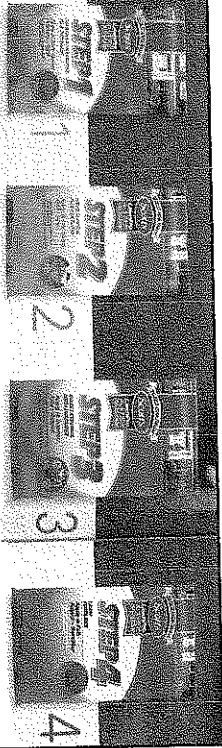
Pesticides are poisons.

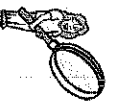


3 of these bags contain pesticides with fertilizer

In a survey done in Massachusetts, 70% of homeowners who said they did not use pesticides, actually listed a product that they used which contained a pesticide (like weed and feed).

(Read the label)





Read the Label

Read the Label

Read the Label

Is it a pesticide? The label is the law.

- EPA registration number -- means toxic/pesticide
- Active ingredients -- are pesticides
- Acute toxicity/handling warnings -- must follow
- % inert ingredients -- are not inert, but that's another story...
- Learn more - Google the terms "toxicity" + pesticide name.
www.pesticideinfo.org or Extoxnet reliable

Pesticides and Childhood Cancer

"...In particular, efforts should be focused to reduce exposure to pesticides used in homes and gardens and on lawns and public lands, which are the major sources of pesticide exposure for most children."

Zahn and Ward, National Cancer Institute, 1998



Health effects of pesticides

- Associations with cancers, birth defects, hormonal disruption, neurological effects
- New research:
- Hormonal disruption, particularly interference with the male reproductive system, at very low concentrations of pesticides
- Crossing generations: Exposure of parents (fathers & mothers) associated with effects in offspring
- Sensitivity of fetuses and young children

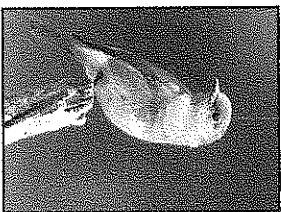


What are the environmental risks of pesticide use?

- Highly toxic to pond, river and ocean life.
- Highly toxic to birds.
- Bio-accumulation poses grave threat to animals higher on the food chain.
- Some persist for decades, and spread throughout the globe.
- Contaminate groundwater.



In 1962, Rachel Carson warned that pesticides were killing birds...



...Thirty years later...

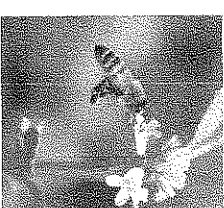
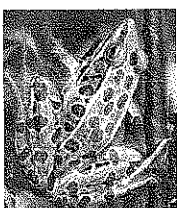
A 1992 study conservatively estimated that 65 million birds die per year from pesticide poisoning or effects. Annual mortality is probably in the hundreds of millions.

Division of Migratory Bird Management, U.S. Fish and Wildlife Service

Leading cause of death in over 80,000 birds examined for West Nile Virus was pesticide poisoning by lawn chemicals. (2001, NY)

More reasons for Organic Lawn Care

- **Nutrient pollution:** Too much Nitrogen in marine systems, too much Phosphorus in freshwater. Organic standards limit fertilizer amounts and require natural fertilizers (slow release)
- **Water resources:** Reducing the need for irrigation – more water-holding capacity in soil with organic matter, more drought tolerance in grass with deep roots.
- **Invasive species:** Organic standards prohibit planting invasives, encourage removal.



Lawns can cause problems

- Pesticide use
- Excess nutrients
- Energy use for inputs (fertilizers and pesticides) and maintenance (mowers, blowers and trimmers)
- Water use
- Noise and air pollution from equipment
- Waste of resources

Adding it all up: a lot of pollution

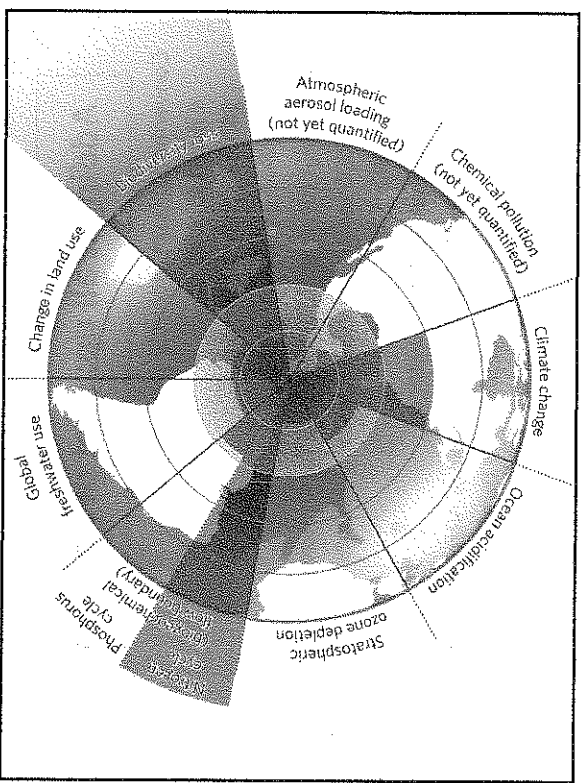
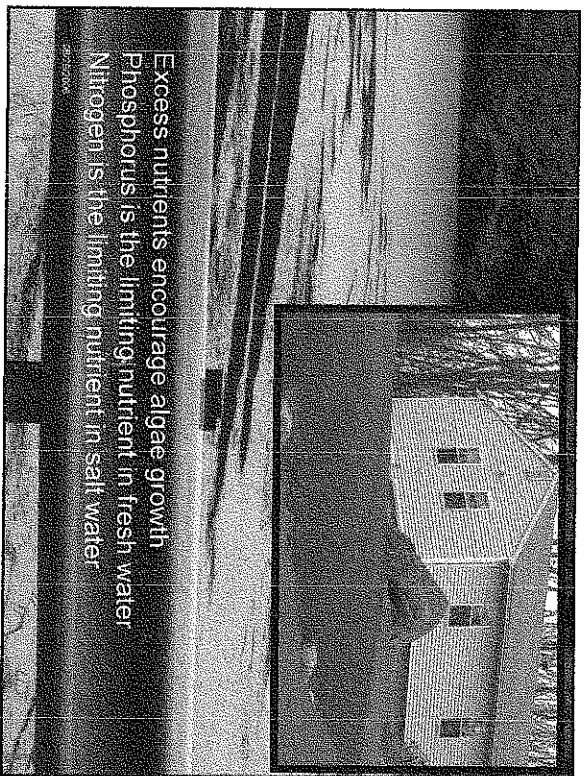
Conventional lawn (per year per acre):

- 4 lbs pesticides
- 140 lbs synthetic nitrogen
- 1 million gallons of water

Connecticut has over 800,000 single family homes.

- 400,000 lbs of pesticide active ingredients
- 14 million lbs of nitrogen
- 100 billion gallons of water

This is almost half of the 8,400 tons/yr of nitrogen that the Long Island Sound Study estimates for total non-point source nitrogen discharged into the Sound.



How to do Organic Land Care

Organic Principles – The Big Picture

- Use Nature's methods *(Work with nature)*
- Pay attention to the whole system
- Ask where things come from, where they go and what the effects are at both ends.
- Cradle to cradle – zero waste.
- Holistic.

...More Big Picture

Nature moves toward four conditions,
Organic Land Care strives to do the same:

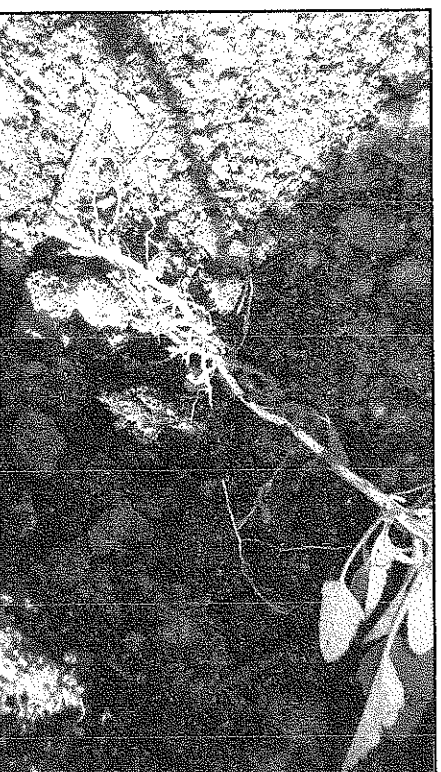
1. **Greater biodiversity** *(Work with nature)*
2. **Increased resilience to environmental insult**
3. **Increased organic matter** *(Feed the soil)*
4. **Greater structural complexity**
5. **Greater variety of organisms and connections**
6. **Increased metabolic stability**
7. **better health; self regulating systems**

Details: How to grow beautiful grass

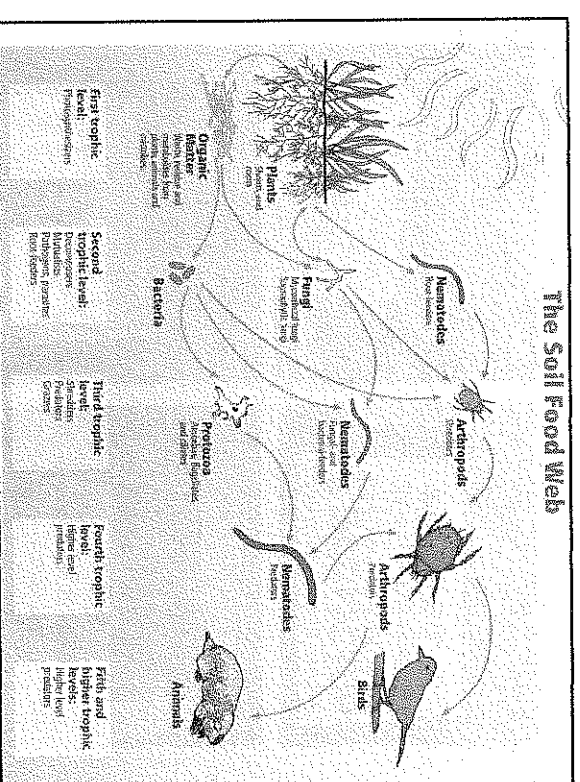
- Test soil
 - Add N, P, or K only as needed (Feed the soil)
 - Adjust pH if needed
 - Add ¼" compost or chopped leaves (Feed the soil)
 - Sow seeds of a variety of grasses
 - Repeat annually
- In the meantime:*
- Mow high, 3 inches
 - Hand pull misc. weeds if desired
 - Save time and money!

Soil Tests

- How to do soil tests- Google: UConn soil test
- Adjust soil using organic materials based on soil test results (Feed the soil)
- pH- use ground limestone (or wood ashes carefully or leaf compost) to raise to near neutral- 6.5-7.0 for vegetables. To 6.0 or above for grass.



(Feed the soil) Soil health is the key
no matter what plants you grow.



Soil Amendments

(Feed the soil)

- Compost and leaves
- Natural materials (and mixtures of them in blended fertilizers) containing Nitrogen (N), Phosphorus (P) and/or Potassium (K)
- Lime (adjusts pH and supplies calcium)
- Cover crops and appropriate rotations
- Ground rocks (and meals/seeds)
- Composted wastes and manures



An application of leaves every fall is the basic fertility program for this region. Note dead wood adding organic matter.

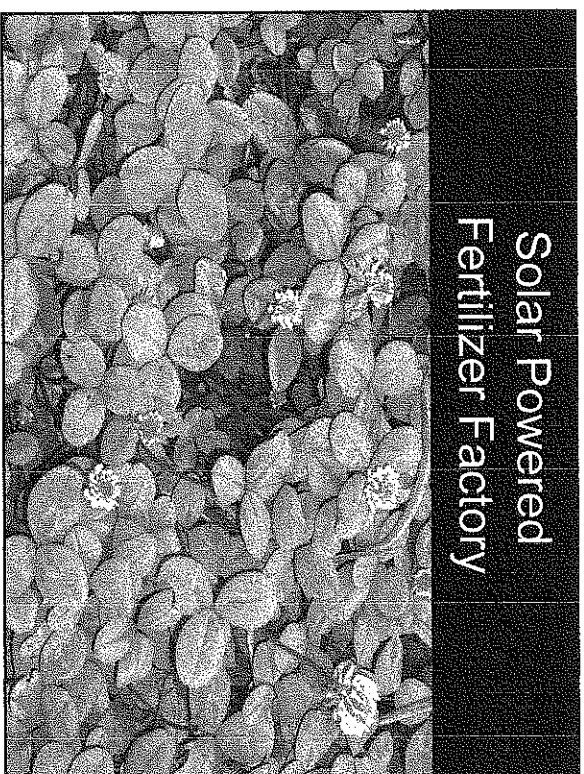
(Work with nature)



Compost, all you need

(Feed the soil)

- Compost may be all the soil amendment you need.
- How to make
- Where to buy



Choosing Grass Seed

- Different Grass Seeds Listed here
- Fescues – more shade tolerant require less fertility
- Ryes – clumping, drought and heat tolerant
- Bluegrass –spreads by rhizomes, sturdy
- White Clover – nitrogen-fixing ability
(Work with nature)

Fescue to the Rescue

Alternative Grass Species for Lower-Maintenance Lawns

Creeping red fescue
(Fine leaf fescue)

- Requires less water - more drought tolerant
- Tolerant to shade
- Produces less fertilizer
- Tolerant to low soil pH
- Maintains greenness during summer
- Resists quality at higher mowing heights
- Turf-type fescues have high salt tolerance

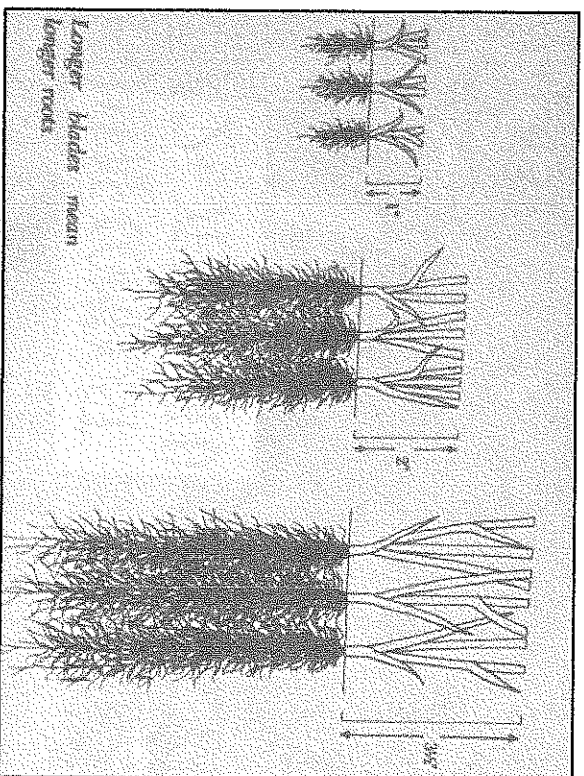
Tall fescue
(Red-top fescue)

- Requires less water - more drought tolerant
- Tolerant to shade
- Produces less fertilizer
- Tolerant to low soil pH
- Maintains greenness during summer
- Resists quality at higher mowing heights
- Turf-type fescues have high salt tolerance

University of California Turfgrass Laboratory

Cultural Practices for Controlling Weeds

- Mowing high, 3 inches *(Work with nature)*
- Hand-pulling
- Reduce compaction - Aerate
- Weeds and what they tell *(Work with nature)*



Mowing Practices

- Mowing high
- Sharp blades
- Use Push reel mowers
- Use Electric mowers
- Mow short in October

Watering

Cultural solutions

Water deeply and less often

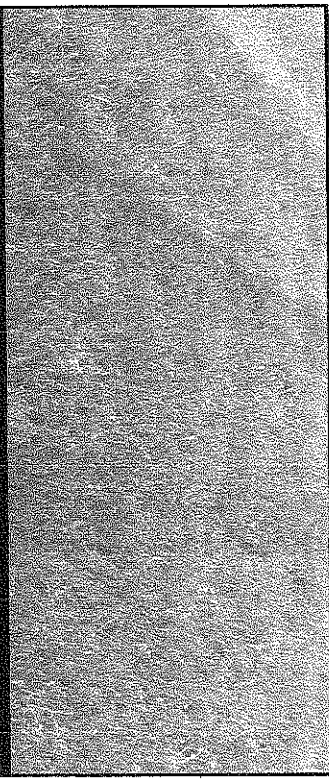
How to measure water applied

Recap: How to grow beautiful grass*

Feed the soil
Feed the grass (Clippings)
Re-Seed annually
Mow high
Water less, but longer
Control weeds without herbicides
Control pests without chemicals

(Work with nature)

*Grassroots Environmental Education

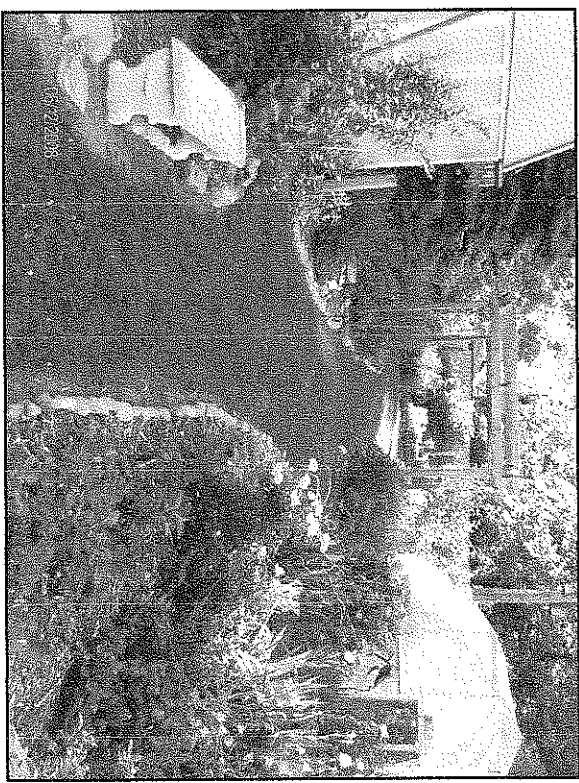


Lawn is good for playing on but doesn't support much biodiversity or provide many environmental services.

Lawn Alternatives

Fun and beautiful things to do with your property:

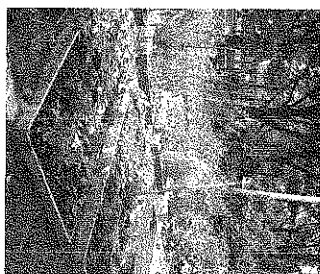
Meadows *(Work with nature)*
Vegetable gardens
Butterfly gardens
Woodland gardens
Freedom lawns



Vegetable Gardens

- 1600 sq. ft. yields \$2,400 worth of vegetables
- \$1.50/ sq.ft. or \$60,000/acre

Roger Doiron, Kitchen
Gardeners International



Where To Go From Here

Helpful Books for sale here:

- Introduction to Organic Lawns and Yards – 53 page booklet

Or go to www.organiclandcare.net and

- Sign up for "Organic with the Seasons" our quarterly Homeowner e-newsletter
- Search for a NOFA Accredited Organic Land Care Professional with the online searchable database
- Read blogs for current articles
- Check the calendar of classes and events
- Seek Professional training – NOFA Accreditation Course
- Use our online turf forum at organiclurfcare.org
- And ...

Feed the soil

Read the label

Work with nature!



To: Transportation, Sustainability and Energy Committee

From: Jeremiah Bartlett, Transportation Systems Engineer

A handwritten signature in black ink, appearing to read "Jeremiah Bartlett".

DISTRIBUTION: Jon Jennings, City Manager
Bob Leeman, Acting Director, Public Services
Katherine Earley, PE, Engineering Services Manager
Bruce Hyman, Transportation Program Manager
Danielle West-Chuhta, Corporation Counsel
Sonia Bean, Executive Assistant
Nancy English, Administrative Assistant
John Peverada, Parking Manager

Date: November 13, 2015

Subject: Winter-Restricted Parking, Riverton Drive and Springbrook Way

I. SUMMARY OF ISSUE

Riverton Drive and Springbrook are the entry points for residences provided by the Portland Housing Authority. In the past, unrestricted parking has been allowed on both sides of these streets. But during and after snow storms, cars remaining parked and continuing snow build up has made the maintenance of Riverton and Springbrook very difficult. The Housing Authority, as well as the Fire Department have expressed concern that emergency and maintenance vehicles may not be able to reach all of the units.

II. REASON FOR SUBMISSION

The Department of Public Services recommends changes which will allow one side of both Riverton and Springbrook be posted as "**No Parking 11/15-4/15**". Portland Housing requested that it be the right hand side (i.e. north side) of the road when entering from Forest Ave.

III. INTENDED RESULT

Emergency and maintenance vehicles will be able to reach all of the housing units in this location when snowbank buildup is significant.

IV. COUNCIL GOAL ADDRESSED

This proposed change addresses the goal of improving City services.

V. FINANCIAL IMPACT

The cost of staff and equipment mobilization, signs and posts is estimated to be approximately \$1600, inclusive of sign preparation and staff time.

VI. STAFF ANALYSIS & RECOMMENDATION

The Department of Public Services and the Parking Control Division have reviewed this change and concur with this action.

SEASONAL NO PARKING ANYTIME BETWEEN 11/15 - 4/15 NORTH SIDE
RIVERTON DR. AND SPRINGBROOK WAY

Riverton Dr

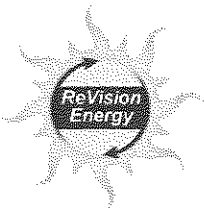
SPRINGBROOK WAY

© 2015 Google

Google earth

Imagery Date: 9/27/2014 43°41'53.99" N 70°19'10.25" W elev 62 ft eye alt 2423 ft

1998



Professional design, installation and service of solar energy systems

Response to Request for Proposal
City of Portland, ME #9215
Solar Photovoltaic Systems



August 20, 2015
City of Portland, ME- City Hall
Purchasing Office, Room 103
389 Congress Street
Portland, ME 04101

91 West Main Street
Liberty, ME 04949

(207) 589-4171

142 Presumpscot Street
Portland, ME 04103

(207) 221-6342

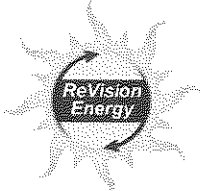
14 Dixon Ave
Concord, NH 03301

(603) 415-0151

7 Commercial Drive
Exeter, NH 03833

(603) 679-1777

www.ReVisionEnergy.com



Professional design, installation and service of solar energy systems

a. Project Summary

ReVision Energy is grateful for the opportunity to provide a response to the City of Portland's Solar Photovoltaic Systems RFP. In response to the City's request, ReVision has reviewed the solar suitability of the proposed sites provided by the City. For sites where solar was found to be feasible, ReVision has completed preliminary solar project designs. Additionally, ReVision has provided a preliminary project design for a solar project to be sited on the city-owned landfill. ReVision's goal is to design each solar project to maximize quality and durability of the system as well as to maximize expected generation and cost-effectiveness of installation. The total preliminary design work yields a total proposed project capacity of 1.86 MW DC, which will generate an estimated 2.27 GWh of electricity each year.

The preliminary design information has been given to ReVision's capital partner, Sunraise Investments, LLC, to model the economics of each solar project from a capital investment perspective. That financial model has been used to recruit tax equity investors to own and operate the solar project for a PPA term of 20 years. Sunraise then uses its financial model to produce a PPA rate schedule that minimizes the total cost to the City of Portland of ownership of the solar project through the PPA, including total year 1-6 PPA payments and the estimated alternative purchase price (APP) in year 7. This ensures that the PPA offer maximizes the long term economic and environmental benefit to the City.

ReVision chose not to design a solar project on the Bramhall Fire Station due to the relatively small roof area in conjunction with excessive shading on the rooftop.

One additional scope of work task of note is that if the City chooses to move forward with the City-owned landfill project, ReVision will work with the Maine Department of Environmental Protection to obtain DEP approval. From a scheduling perspective, the landfill project would likely not be constructed until spring of 2016 since the landfill will experience snow cover during the winter.

91 West Main Street
Liberty, ME 04949

(207) 589-4171

142 Presumpscot Street
Portland, ME 04103

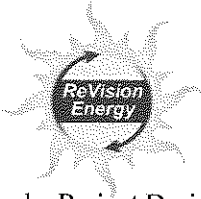
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Professional design, installation and service of solar energy systems

b. Project Design

Please see attached site maps for each site.

Landfill – Project Summary

The proposed system for the landfill consists of 2,916 x 310 watt ReneSola Tier 1, bankable (Bloomberg New Energy Finance) standard efficiency solar panels that will be coupled to twenty seven SMA three phase high efficiency 24kW solar inverters. The resulting capacity of the system is 904kW DC with a maximum AC capacity of 648kW, which meets the maximum allowable AC system size for net metered systems (660kW per PUC rules). The mounting system for this array is proposed to be of a ballasted type where sections of roughly 12 modules will be mounted to racking attached to concrete ballast blocks. This configuration allows the solar array to adapt to the settling landfill over time and avoids penetrating the landfill cap. A dedicated three phase service is included in the cost of this proposal and will connect the site to the three phase utility lines located on route 9.

The solar array will face true south and the panels will be mounted at a 35-degree angle above horizontal.

Portland Arts and Technology High School – Project Summary

The proposed system for PATHS consists of 940 x 260 watt Q-Cells Tier 1 bankable (Bloomberg New Energy Finance) standard efficiency solar panels that will be coupled to one SMA 20kW and seven SMA 24kW high efficiency three phase string inverters. The resulting capacity of the system is 244.4kW DC with a maximum AC capacity of 188kW AC.

The solar panels will be mounted to a ballasted East / West racking system where the solar panels are mounted at an angle of ten degrees and will face opposite directions. This configuration allows for the best power and energy density possible on the roof space while minimizing the ballast (pounds per square foot) requirements to resist wind uplift of 120mph.

King Middle School – Project Summary

The proposed system for King Middle School consists of 940 x 260 watt Q-Cells Tier 1 bankable (Bloomberg New Energy Finance) standard efficiency solar panels that will be coupled to five SMA 20kW and six SMA 24kW high efficiency three phase string inverters. The resulting capacity of the system is 301.6kW DC with a maximum AC capacity of 244kW AC.

The solar panels will be mounted to a ballasted East / West racking system where the solar panels are mounted at an angle of ten degrees and will face opposite directions. This configuration allows for the best power and energy density possible on the roof space while minimizing the ballast (pounds per square foot) requirements to resist wind uplift of 120mph.

91 West Main Street
Liberty, ME 04949

(207) 589-4171

142 Presumpscot Street
Portland, ME 04103

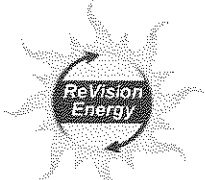
(207) 221-6342

14 Dixon Ave
Concord, NH 03301

(603) 415-0151

7 Commercial Drive
Exeter, NH 03833

(603) 679-1777



Professional design, installation and service of solar energy systems

Jetport Parking Canopy – Project Summary

The proposed system for the parking canopy at the Portland Jetport consists of 1248 x 260 watt Q-Cells Tier 1 bankable (Bloomberg New Energy Finance) standard efficiency solar panels that will be coupled to ten SMA 24kW high efficiency three phase string inverters. The resulting capacity of the system is 324.48kW DC with a maximum AC capacity of 240kW AC.

The solar panels will be mounted flush to the roof using an aluminum rail mounting system. The rails will be attached to the standing seam roof using alloy non-penetrating clamps. The layout of the individual rows will be without gaps and the rows of panels will follow the contour of the roof. The southern half of the roof will be completely covered and will consist of five rows of 96 panels each. The upper most half of the northern facing section of roof will be covered with four rows of 96 panels each. Even though these panels will have a slight northern orientation the annual production is still sufficient to make the investment worthwhile (similar to East/West oriented systems). Mounting angles will vary between one and fifteen degrees above horizontal.

Library Storage Facility – Project Summary

The proposed system for Library Storage Facility consists of 288 x 260 watt Q-Cells Tier 1 bankable (Bloomberg New Energy Finance) standard efficiency solar panels that will be coupled to three SMA 24kW high efficiency three phase string inverters. The resulting capacity of the system is 89.28kW DC with a maximum AC capacity of 72kW AC.

The solar panels will be mounted flush to the five degree roof using an aluminum rail system. The rails will be attached to the wooden 'sleepers' that were installed under the membrane roof during the recent renovation of the building (ReVision Energy assisted in the layout and design of the 'sleeper' system prior to the renovation process). All penetrations and attachments will be flashed and sealed by a certified roofing contractor in order to maintain the roof warranty. Only the southwestern facing roof slope has sleepers installed under it, so we are not proposing to install any solar panels on the northeastern roof slope.

Jetport Main Terminal Roof - Due to the mounting requirements and multiple shading obstacles we determined that it would not be cost effective to install a solar array at this location.

Bramhall Fire Station - Due to significant shading obstacles we determined that it would not be cost effective to install a solar array at this location.

yes
Candell
King
Guthrie
Library Storage
No Jetport Main Terminal
Bramhall

91 West Main Street
Liberty, ME 04949

(207) 589-4171

142 Presumpscot Street
Portland, ME 04103

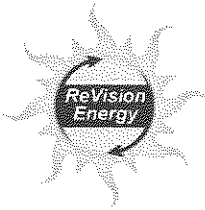
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Discussion of Demand Charges and impact of solar arrays

Demand charges are derived from measuring electrical load in 15 minute intervals, with the actual charge being based on the highest 15-minute interval of load in any given billing period. This peak load period in Maine is typically in the afternoon, and is coincident with the maximum production from solar arrays. But because solar only produces when the sun is shining, and because electric loads are generally consistent day to day, there will typically be at least one day each month when solar generation is low (a rainy or cloudy day). So solar will generally have an unpredictable impact on demand charges.

However, solar power is destined to have a large impact on demand charges once energy storage technologies mature, at which time relatively small amounts of onsite storage can be combined with automated controls and an existing solar power system to eliminate the peaks in load and thus greatly reduce demand charges at very low cost. Solar power systems installed today will integrate with energy storage systems of the (relatively near, within 5 years) future. The solar power will offset peak loads on most days, with the low solar days being met by onsite stored energy. At that time, solar arrays installed under the current Net Energy Billing statutes will provide greatly increased financial value to their owners.

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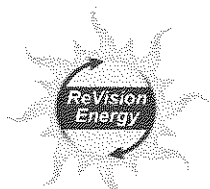
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c. Project Generation

Please see attached PV Watts analyses for each site.

<u>Site Name</u>	<u>Estimated Annual Generation (kWh)</u>	<u>Sunlight Availability</u>	<u>Dark Time (Hours per day)</u>	<u>Maintenance Downtime</u>	<u>Mean Time Between Failures</u>	<u>System Losses</u>	<u>Net Metering</u>
Landfill	1,244,475	99%	12 hours	<0.1%	20 years	14%	Yes
Arts & Tech- East	121,652	99%	12 hours	<0.1%	20 years	21%	Yes
Arts & Tech- West	135,143	99%	12 hours	<0.1%	20 years	21%	Yes
King Middle- East	155,889	99%	12 hours	<0.1%	20 years	21%	Yes
King Middle- West	161,121	99%	12 hours	<0.1%	20 years	21%	Yes
Jetport Parking Canopy	349,789*	99%	12 hours	<0.1%	20 years	21%	Yes
Library Storage Facility	97,180	99%	12 hours	<0.1%	20 years	21%	Yes

*To best estimate energy production on a barrel-shaped roof, several iterations of annual production estimates were run at varying array tilts. The table below matches the Jetport Canopy PV Watts Runs.

kWh / kW		Azimuth	
		185°	5°
Average Tilt	14°	1,185	N/A
	7°	1,128	979
	1°	1,068	1,046

The average of the five runs above, measured at varying tilt angles and azimuth, for the south and north sides of the array, is shown below with the total estimated annual energy production (kWh per year) for the system sized at 324.48 kWDC.

None of the proposed sites are subject to significant shading, and therefore we expect 99% sunlight availability on each site. Non-daylight hours (dark time) average about 12 hours per day worldwide. We do not expect significant maintenance downtime, as solar PV requires little to no maintenance. We do not expect system failures of any kind. Inverter replacements are typically expected around year 20. Total system losses for each system are estimated by PV Watts analyses and are listed above. All projects will need to be net metered unless the base load of site exceeds the maximum PV output, which is rare.

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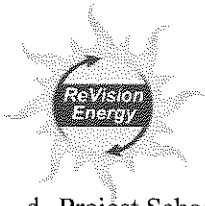
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d. Project Schedules

Please see attached preliminary Gantt charts for both landfill and roof-mounted projects.

Roof-Mounted Projects

Our first step will be to schedule an engineering and pre-construction site visit to each site to confirm our preliminary project designs and to make any final adjustments. In cases where rooftop structural analyses are required, we will contract with an independent professional engineer to review the structural integrity of each rooftop and our proposed project designs to ensure that the solar project meets minimum wind loading requirements and that the rooftops can support the added weight load of the solar project. In these cases, the structural engineer will provide a PE-stamped letter of approval.

Once the engineering review is finalized, we will move to a simultaneous PPA contract negotiation between our investment partner/project owner, Sunraise Investments, LLC, and the City of Portland, and EPC (engineering, procurement, and construction) negotiations between Sunraise Investments, LLC and ReVision Energy. These negotiations will finalize the PPA rate terms between host and owner as well as the EPC contract between owner and contractor.

When fully-negotiated contracts are signed, ReVision Energy will start three parallel path processes: procurement, interconnection and permitting. ReVision Energy will generate a bill of materials from the finalized system designs and procure all major system components. ReVision will also provide finalized design information as well as an application to interconnect to CMP for review. Finally, ReVision will file all building and electrical permits with the local Authority Having Jurisdiction (AHJ).

Once interconnection has been approved, building and electrical permits have been issued and all equipment is available to deliver to the project site, construction will begin. When construction is complete, we will call for a building inspection from the local AHJ where a Certificate of Completion will be issued. Once that Certificate of Completion has been issued, it will be provided to the utility and a Witness Test will be scheduled. Once the utility has completed its witness test, it will provide permission to operate and the project will be commercially operational.

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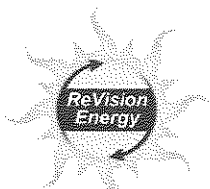
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Landfill Project

The landfill project process, while very similar to the process above, has an added layer of complexity. Prior to PPA and EPC contract negotiations, ReVision will apply for and obtain permission from the Maine Department of Environmental Protection to build the solar project on the landfill. The DEP may ask ReVision to alter the array layout or interconnection path, and thus the project design will not be finalized until DEP has provided its design requirements.

Because the landfill is a ground mounted project and will experience snow cover over the winter, ReVision will order equipment in the spring of 2016 so that the equipment arrives just prior to the spring thaw. At that time construction will begin and the project schedule will follow closely to the roof-mount schedule above.

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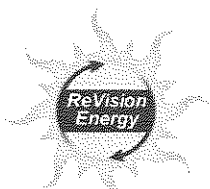
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e. Strength and Experience

ReVision Energy is Northern New England's leading solar design, installation and service company. We are locally-owned and staffed, with more than 20 years of direct solar energy design and installation experience, including over 5,000 systems installed. ReVision Energy currently has over 100 full time employees in our four locations in New Hampshire and Maine. ReVision is a Certified B Corp. A core part of our company mission is to help our region transition from the current fossil fuel-based economy and into a more sustainable economy based on clean, renewable and local energy sources.

To ensure maximum performance and longevity in a relatively harsh northern climate, every ReVision system is designed by our in-house solar engineers (Dartmouth, UNH, MIT and Brown) and installed by our NABCEP certified Project Managers (PM) and installer crews. Our PM's oversee teams composed of Master Electricians and licensed Apprentices who participate in our certified US Division of Labor Apprenticeship program. Several sales and installation crew members also carry NABCEP certifications to ensure technical competency throughout each phase of a project installation. Our installers each hold their OSHA cards, are fully insured, and have been thoroughly trained to provide the construction of solar energy arrays in a professional and safe manner. Each member of our team maintains full time employment, enjoys a competitive benefits package, participates in our profit sharing model and is dedicated to upholding the legendary customer service and workmanship upon which ReVision Energy was founded.

From an administrative perspective, our experience in handling projects of any scale is unmatched in Northern New England. Responsiveness, honesty and technical competency are at the forefront of our business philosophy and permeate every level of the company to ensure a positive solar energy investment experience. ReVision Energy's unprecedented installation volume in the region also helps to create and sustain a robust supply chain. We have full-time purchasing and warehousing departments that ensure all our projects are run smoothly and are committed to securing the highest quality components at the most competitive pricing.

ReVision Energy has helped dozens of municipalities to transition to clean, renewable energy. Our development process includes educating our clients on the various capital structures available to finance solar, including turnkey purchases, leases, and Power Purchase Agreements (PPA) and the advantages/disadvantages of each. ReVision has designed, built and financed more than 2 MW of completed PPA projects, including over 500 kW in installed capacity for ten municipalities. ReVision is in final negotiations for a solar PPA contract with the City of Belfast, Maine for a solar project to be built on the closed municipal landfill starting in the fall of 2015. Revision has also completed a site feasibility study for a several megawatt solar PPA project on a municipal landfill in South Portland, ME.

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Key Personnel

William Behrens, PhD, Co-founder of ReVision Energy

Dr. Bill Behrens, partner of ReVision Energy, oversees our engineering department. Dr. Behrens and his team of engineers specialize in designing and sourcing PV Solar system components based on best efficiency, availability of product, warranties and longevity. Bill is the managing partner for ReVision's Photovoltaic division, and also works in system design for both thermal and solar electric projects. He earned a PhD in Environmental Economics and a BS in Electrical Engineering from MIT. Upon completing his doctorate he taught at Dartmouth before moving to Maine and entering the construction industry. Bill has overseen the design and installation of several megawatts of PV over the last 20 years of direct experience in the field. He is also an original co-founder of The Green Store in Belfast, ME. His role in this project is to oversee system design and component specifications.

Fortunat Mueller, P.E., Co-founder of ReVision Energy

Mr. Mueller is managing partner of ReVision's Solar Thermal division and of the company's Portland and Exeter branches. He handles solar thermal and solar electric system design for both commercial and residential applications. Mr. Mueller received a Masters in Mechanical Engineering from Brown University and is a licensed Professional Engineer in Maine. He is also a licensed solar thermal installer. Before joining ReVision Energy in 2006, Fortunat was a project manager and senior systems engineer at United Technologies Fuel Cells in Hartford, CT.

Phil Coupe, Co-founder of ReVision Energy, Maine Solar Thermal & PV Installer Certification

Phil leads the sales and marketing efforts at ReVision. After earning a BA in Journalism at Boston College, he worked as a reporter in Washington, DC, then served as vice president & director of corporate philanthropy at a bottled water company he helped found. The company twice made the Inc.500 list of fastest-growing companies in America and received numerous awards for its commitment to serving disadvantaged children and for its environmental initiatives. He is also president of Smart Energy Now, a nonprofit whose mission is to bring renewable energy systems and curriculum to New England schools, and serves on the board and marketing committee of the Environmental & Energy Technology Council of Maine.

Geoff Sparrow, P.E., Director of Engineering, NABCEP PV & Thermal Certification

Mr. Sparrow is one of the most experienced solar professionals in northern New England, having designed and installed hundreds of commercial and residential systems. After graduating with a BS in Mechanical Engineering from the University of New Hampshire, he worked for one of the largest mechanical contracting companies in southern Maine before starting his own small business focused on commercial and residential construction services. Since joining ReVision Energy in 2006, Mr. Sparrow has earned his solar thermal and photovoltaic installers license from the state of Maine and has become NABCEP certified in both

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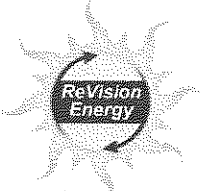
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photovoltaics and solar thermal, in both ME and NH. His role is to ensure the project meets NABCEP certification, and to coordinate the office and field activities.

James Hasselbeck, Operations Manager, NABCEP PV Certification

Mr. Hasselbeck has been involved in the design and construction of public and private renewable energy projects since 2006. Graduating from the University of Vermont with a BA in English and Sociology, James went on to Waterline Alternative Energies, a startup focused on the design and construction of Solar and Wind projects. While at Waterline James went on to design and Project Manage several MW of Photovoltaic projects. These included several ARRA funded projects, USDA grant funded projects, one of the first Municipal Power Purchase Agreements signed in Massachusetts (Yarmouth, 276kW) and one of the largest state funded solar projects in Massachusetts (Lowell, 606 kW). James also holds his NABCEP PV Installer certification and has completed over 120 hours of IREC certified Advanced Solar Design courses. He has also been involved in the electrical design and construction of many multi-million dollar critical infrastructure retrofits and new construction projects in the Municipal Water and Wastewater industry.

Bill Levay, Photovoltaic Division Head, Master Electrician, NABCEP PV Certification

Bill carries over 10 years of electrical experience, and 6 years experience as a Master Electrician. He holds his Master Electrician license in NH, ME, PA and CT. Bill graduated with an Associate's Degree in Electrical Construction from KVCC (2006), and a BA in Business from the University of Maine at Farmington (2010). Prior to joining ReVision Energy in 2010, Bill worked for Vox Energy Solutions in PA installing solar systems. He works today on our photovoltaic installation team based in Exeter, NH.

Steve Hinchman, Director of Finance

Steve Hinchman has served as Revision's Director of Financing since 2011 and has guided the company in the development of a \$3+ million portfolio of solar PPA projects. Steve specializes in developing financial and tax-advantaged investment models to achieve the most cost effective ownership structures for municipal and non-profit solar development. Steve brings more than forty years of legal and public policy experience to Revision, including a decade of energy and environmental law practice in New England.

A 2003 Graduate, Summa Cum Laude, of the Vermont Law School, Mr. Hinchman is admitted to the bar in Maine, the U.S. District Court of Maine, and the First and D.C. Circuit Courts of Appeals, and has participated in climate cases before the Second and Ninth Circuit Courts of Appeals. Mr. Hinchman has also practiced before the Maine Board of Environmental Protection, the Land Use Regulatory Commission, the Maine Ethics Commission, and the Legislature's Joint Standing Committees on Natural Resources and Energy and Utilities.

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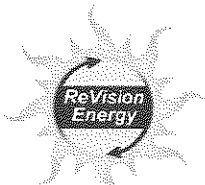
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Financial Strength

ReVision Energy, LLC (TIN: 26-1825324) is a Maine-based Limited Liability Company formed in 2003. Since 2003 only very minor changes in ownership have occurred; our NH branch manager, Daniel Clapp, has acquired a 5% ownership interest. ReVision Energy operates under no other name. Revision Energy, LLC is licensed to do business in Maine and has never been party to any legal dispute regarding a performance contract.

ReVision Energy has been supported by United Insurance in prior projects requiring performance and payment bonds, and will be fully capable of meeting reasonable bonding requirements of the City of Portland, should ReVision be chosen contractor. Estimated cost of performance and payment bonding is 1-2% of project, which will be carried by the investor offering the PPA to the City, and not directly by the City.

ReVision Energy LLC is a privately held company with three principal owner-operators (Behrens, Mueller, Coupe) and 100+ employees. Annual revenues 2015 will be ~\$20M. ReVision maintains a fleet of 30+ vehicles in order to serve its installation and support crews. ReVision maintains 3 full-service locations (Exeter, Portland, and Liberty) with sales, service, installation, and administrative functionality; and one (Concord) office with sales and installation functionality. Centralized bookkeeping for payroll, insurance, and accounts payable is operated from the Liberty office through a single point of contact, Bookkeeper Holly McFaul. Revision employs in house HR management and maintains fully current Worker's Compensation coverage along with other typical business insurance coverages; and offers all employees HSA-compatible health coverage and 401(K) plans. Current debt is limited to vehicles; Revision maintains credit lines with two financial institutions, with both lines carrying a current balance of \$0. Current inventory totals ~\$1.4M. Tax preparation is provided by Baker Newman Noyes of Portland, Maine. All financial data can be made available, should ReVision become chosen contractor for the City of Portland contingent upon the city's willingness to sign a non-disclosure agreement regarding private financial information.

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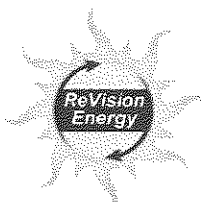
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f. Project References

Completed Projects

375 kW Grid-Tied Photovoltaic System for Proctor Academy, NH (5 campus rooftops, 1 ground mount)

Turnkey Design, Installation and PPA development by ReVision Energy -

Phase 1- 74 kW- installed fall 2012

Phase 2- 304 kW- installed summer 2015

Project Cost: \$1,078,189

Phase 1- \$277,764

Phase 2- \$800,425

Financing Structure: Power Purchase Agreements

Phase 1 – financing provided by ReVision Energy, LLC

Phase 2 – financing provided by partnership with IGS Solar, LLC.

Expected Annual Generation:

Phase 1- 78,253 kWh

Phase 2 – 308,628 kWh

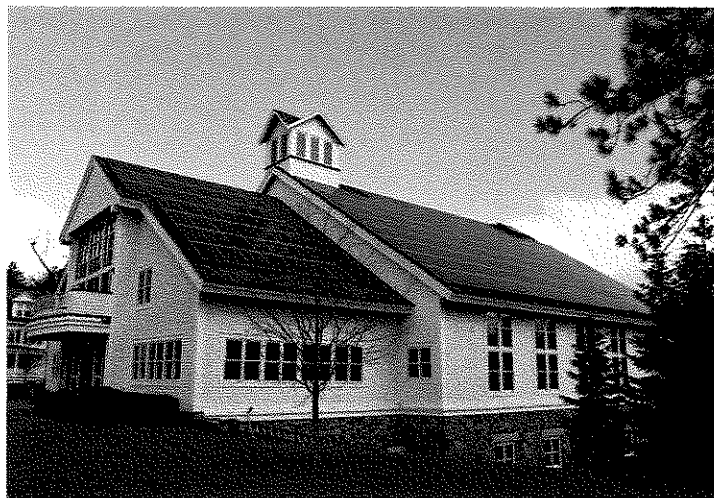
Actual Annual Generation:

Phase 1- 83,791 kWh

Phase 2 – N/A

Savings Shortfalls: *None*

Contact: John Ferris – CFO – (603) 735-6206 – john@proctornet.com



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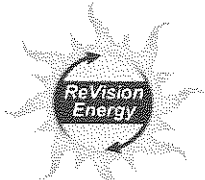
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170 kW Grid-Tied Photovoltaic System for Thomas College, Maine (1 campus rooftop, Athletic Center)

Turnkey Design, Installation and PPA development by ReVision Energy - Installed Fall 2012 on time and on budget

Project Cost: \$707,973

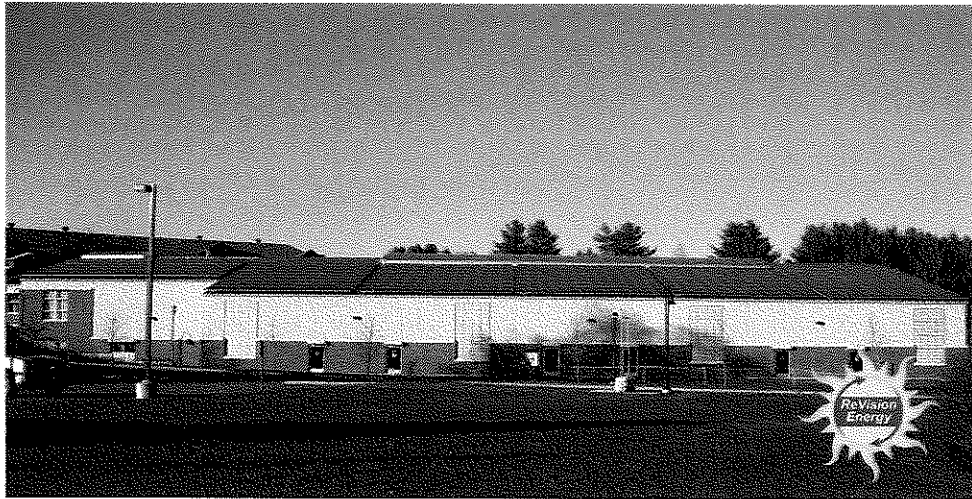
Financial Structure: PPA financed by ReVision Energy

Expected Annual Generation: 175,595 kWh

Actual Annual Generation: 182,391 kWh

Savings Shortfall: *None*

Contact: Chris Rhoda – VP for Information Services and CIO - (207) 465-0945 – chris@thomas.edu



127 kW Grid-Tied Photovoltaic System for Colby Sawyer College, NH (4 academic building rooftops)

Turnkey Design, Installation and PPA development by ReVision Energy - Installed Fall 2012 on time and on budget

Project Cost: \$508,719

Financing Structure: PPA financed by ReVision Energy

Expected Annual Generation: 130,440 kWh

Actual Annual Generation: 145,900 kWh

Savings Shortfall: *None*

Contact: Doug Atkins – VP of Administration – (603) 526-3880 – datkins@colby-sawyer.edu

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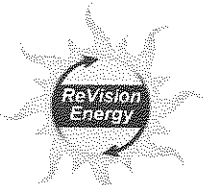
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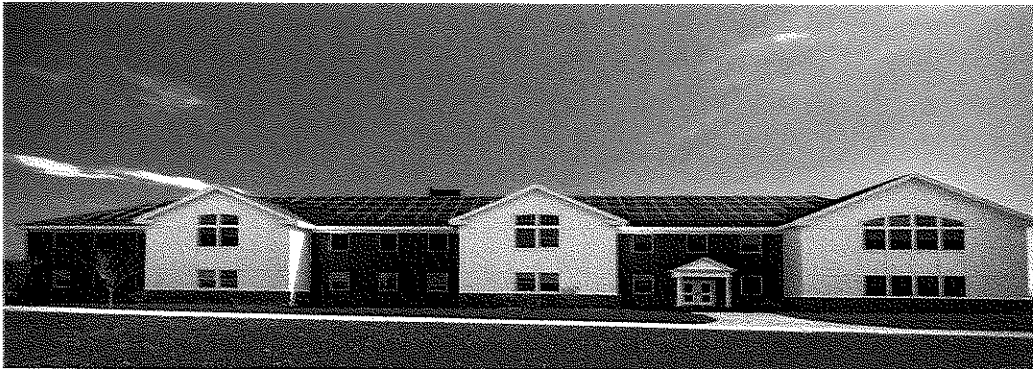
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120kW Grid-Tied Photovoltaic System for Town of Durham, NH (2 rooftops- Ice Rink and Library)

Turnkey Design, Installation and PPA development by ReVision Energy - Installed Fall 2013 on time and on budget

Project Cost: \$413,471

Financing Structure: PPA financed by ReVision Energy

Expected Annual Generation: 103,387 kWh

Actual Annual Generation: 103,708 kWh

Savings Shortfall: **None**

Contact: Todd Selig – Town Administrator – (603) 868-5571 – tselig@csi.durham.nh.us



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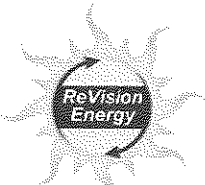
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Alternative System Applications

50kW Grid-Tied Photovoltaic System for Maine Audubon, ME (6 tracker system)

Turnkey Design, Installation and PPA development by ReVision Energy - Installed Fall 2014 on time and on budget

Project Cost: \$216,426

Financing Structure: PPA – financed by Moody's Collision, Inc.

Expected Annual Generation: 75 MWh

Actual Annual Generation: N/A

Savings Shortfall: *None*

Contact: Ted Koffman- Property Management- (207) 781-6180 x 228- tkoffman@maineaudubon.org



71kW Grid-Tied Photovoltaic System for Eastman's Corner, NH (Large Pole-Mount on Steep Slope)

Turnkey Design and Installation by ReVision Energy - Installed Winter 2015 on time and on budget

Project Cost: \$310,544

Financing Structure: Turnkey

Expected Annual Generation: 85 MWh

Actual Annual Generation: N/A

Savings Shortfall: *None*

Contact: Bruce Cilley- Property Management- (603) 583-4109- bcilley@kickboston.com



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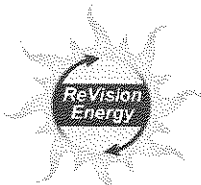
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Projects Under Development

1 MW Grid-Tied Photovoltaic System for Unity College, ME (1 ground mount, 2 campus rooftops)

Turnkey Design, Installation and PPA development by ReVision Energy –

Construction Commencement Fall 2015, Commissioning Earth Day 2016

Project Cost: \$2.8M

Financing Structure: PPA -- financing to be provided by Sunraise Capital, LLC

Expected Annual Generation: 1,238 MWh

Actual Annual Generation: N/A

Savings Shortfall: N/A

Contact: Melik Khoury– Vice President – (207) 298-0333 – mkhoury@unity.edu

640.5 kW Grid-Tied Photovoltaic System for Town of Durham, NH (1 ground mount at Gravel Pit)

Turnkey Design, Installation and PPA development by ReVision Energy –

Construction Commencement Fall 2015, Commissioning YE2015

Project Cost: \$2M

Financing Structure: PPA, financing to be provided by IGS Solar, LLC

Expected Annual Generation: 810 MWh

Actual Annual Generation: N/A

Savings Shortfall: N/A

Contact: Todd Selig – Town Administrator – (603) 868-5571 – tselig@csi.durham.nh.us

256.2 kW Grid-Tied Photovoltaic System for Village District of Eastman (1 ground mount at Water Treatment Plant)

Turnkey Design, Installation and PPA development by ReVision Energy –

Construction Commencement Fall 2015, Commissioning YE2015

Project Cost: \$768,600

Financing Structure: PPA, financing to be provided by IGS Solar, LLC

Expected Annual Generation: 329 MWh

Actual Annual Generation: N/A

Savings Shortfall: N/A

Contact: Duncan Wood- Village District Chairman of the Board- (617) 835-1230- duncanwood@gmail.com

128 kW Grid-Tied Photovoltaic System for City of Belfast (1 ground mount at Municipal Landfill)

Turnkey Design, Installation and PPA development by ReVision Energy –

Construction Commencement Fall 2015, Commissioning YE2015

Project Cost: \$377,558

Financing Structure: PPA, financing to be provided by IGS Solar, LLC

Expected Annual Generation: 154 MWh

Actual Annual Generation: N/A

Savings Shortfall: N/A

Sadie Lloyd- City Planner- (207) 338-1417 x25- slloyd@cityofbelfast.org

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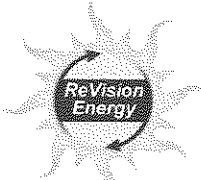
(207) 221-6342

14 Dixon Ave
Concord, NH 03301

(603) 415-0151

7 Commercial Drive
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(603) 679-1777



Professional design, installation and service of solar energy systems

g. Monitoring Capabilities

Instant access to real-time solar generation data is a central feature of all ReVision solar projects. Revision uses SolarLog revenue-grade monitoring hardware to allow clients access to web-based interactive, real-time generation data so that the solar project can be monitored in real-time, can be displayed or made available to project constituents or other interested parties, and can be used as an educational tool for students of local schools.

Solar-Log Highlights

- Simple plug & play socket meter installation, with no on-site configuration
- Certified Revenue Grade Metering (RGM) incentive reporting
- Compatible with any inverter architecture
- Convenient online plant performance and power meter monitoring via Solar-Log® WEB
- Appealing Solar-Log® Dashboard for presenting plant performance via local or public display
- Plant performance visualization via iPhone (iOS) and Android apps
- Meteorological satellite data-based performance monitoring

ReVision Energy currently has the capability to monitor hundreds of its residential and small commercial turnkey solar projects installed over the past decade. Additionally, ReVision Energy actively monitors dozens of its solar PPA projects that it owns, or that are owned by its investment partners.

h. Service Responsiveness Capabilities

ReVision Energy is a full service design/built contractor. We service and maintain all of the solar energy systems that we have installed. The Portland branch of ReVision Energy maintains a full staff of office and service personnel of over 30 people, which allows us to respond to service needs within hours. This ability is accomplished by maintaining an around the clock service line, and an 'on call' group of technicians. We maintain four separate solar electric installation/service crews that consist of licensed electricians and NABCEP certified technicians. The size, versatility, and proximity of the Portland branch of ReVision Energy will give us a unique ability to respond to any potential service issues very quickly.

As part of our design and installation process we produce documentation that includes system schematics, array layouts, and electrical line drawings. Having this documentation on hand allows us to expedite the troubleshoot process, resulting in fewer billable hours of service time.

- i. If selected, ReVision Energy agrees to comply with all of the terms and conditions of all grants that may be received.

91 West Main Street
Liberty, ME 04949

(207) 589-4171

142 Presumpscot Street
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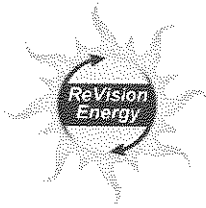
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j. Pro Forma Statement

Please see attached Pro Forma for each project.

Year 1 Bond Vs. Year 7 Bond

After consideration and analysis of variable finance scenarios, SunRaise and Revision have concluded that the most economical path for the City of Portland to benefit from solar energy is through an acquisition of the solar projects via municipal bond on January 1st, 2023. At this point, Portland will have been in a Power Purchase Agreement (PPA) with SunRaise for 6 years, and will be able to exercise the option to take ownership of the solar infrastructure at the corresponding Alternative Purchase Price. This Alternative Purchase Price for both the Landfill and Distributed Generation PPAs are attached to this document, alongside the proposed PPA rate structure. These alternative purchase prices represent a substantial discount on the initial installed cost. By issuing a bond in year 7 rather than year 1, the city is able to reduce the amount of the bond by 28%. This reduction of bond issuance directly correlates to a lower annual bond service payment. As a result, the City of Portland is better suited to achieve their solar energy goals by owning the projects by purchasing in year 7 as opposed to year 1, and as opposed to continuing the purchase of solar energy from SunRaise under the PPA contract. This comparison for both the landfill and distributed generation projects are attached to this response. As the comparison shows, by partnering with SunRaise and issuing a bond in year 7, the City of Portland is able to go solar most economically. By our calculations, the City of Portland may likely save over \$1,600,000 compared to immediate bonding – by simply entering a PPA and bonding the Alternative Purchase Price in year 7.

Other municipalities, notably Belfast, Maine and Durham N.H. among others, have used this strategy to achieve the lowest possible electricity cost over the long term. By coupling 6 years of PPA ownership with 34+ years of City ownership, the cost of solar energy is reduced to a level well below the possible market cost, resulting in the maximum possible savings to the City of Portland. End of life decommissioning costs of solar arrays are expected to be fully offset by the market scrap value of the inherent materials of steel, glass, and aluminum; thus City ownership of the solar arrays delivers electricity for merely the cost of the bond service which is typically paid within at most 10 years, insurance, and inverter replacement. All of these costs can be predicted and scheduled, ReVision will provide the City with a full analysis of lifetime ownership under multiple scenarios.

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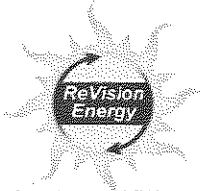
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Portland Landfill 20-Year PPA

Price Schedule		
Operation Year	Price per kWh	Estimated Alternative Purchase Price*
1	\$ 0.11500	-
2	\$ 0.11730	-
3	\$ 0.11965	-
4	\$ 0.12204	-
5	\$ 0.12448	-
6	\$ 0.12697	-
7	\$ 0.15400	\$ 2,001,969
8	\$ 0.15708	\$ 1,890,303
9	\$ 0.16022	\$ 1,769,396
10	\$ 0.16343	\$ 1,638,650
11	\$ 0.16669	\$ 1,542,560
12	\$ 0.17003	\$ 1,437,809
13	\$ 0.17343	\$ 1,323,832
14	\$ 0.17690	\$ 1,200,033
15	\$ 0.18044	\$ 1,065,779
16	\$ 0.18404	\$ 920,395
17	\$ 0.18773	\$ 763,170
18	\$ 0.19148	\$ 593,346
19	\$ 0.19531	\$ 410,119
20	\$ 0.19922	\$ 212,639

*Alternative Purchase Price. At the sole discretion of the Host, the Host may purchase the system for the negotiated price. This negotiated price is the result of guidance provided in the IRS Announcement 2009-69.

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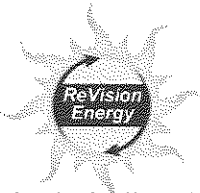
(207) 221-6342

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(603) 415-0151

7 Commercial Drive
Exeter, NH 03833

(603) 679-1777



Professional design, installation and service of solar energy systems

Portland Distributed Generation 20-Year PPA

Price Schedule		
Operation Year	Price per kWh	Estimated Alternative Purchase Price*
1	\$ 0.12900	-
2	\$ 0.13158	-
3	\$ 0.13421	-
4	\$ 0.13690	-
5	\$ 0.13963	-
6	\$ 0.14243	-
7	\$ 0.16890	\$ 1,791,198
8	\$ 0.17228	\$ 1,693,814
9	\$ 0.17572	\$ 1,588,282
10	\$ 0.17924	\$ 1,474,076
11	\$ 0.18282	\$ 1,387,637
12	\$ 0.18648	\$ 1,293,406
13	\$ 0.19021	\$ 1,190,876
14	\$ 0.19401	\$ 1,079,511
15	\$ 0.19789	\$ 958,740
16	\$ 0.20185	\$ 827,958
17	\$ 0.20589	\$ 686,523
18	\$ 0.21001	\$ 533,754
19	\$ 0.21421	\$ 368,930
20	\$ 0.21849	\$ 191,283

*Alternative Purchase Price. At the sole discretion of the Host, the Host may purchase the system for the negotiated price. This negotiated price is the result of guidance provided in the IRS Announcement 2009-69.

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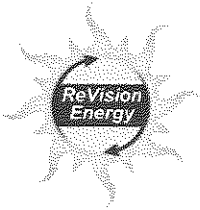
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Professional design, installation and service of solar energy systems

k. Proposal Form

This RFP seeks “one or more Third-Party Solar Energy Providers (“Providers”) to design, install, finance, own, operate and maintain one or more solar photovoltaic systems at certain City facilities pursuant to the terms and conditions of a Solar Energy Power Purchase Agreement (“PPA”) and according to the pricing proposals received. The City will purchase from the selected Solar Provider, all electricity output generated by the Projects in accordance with the terms and conditions of the PPA.”

Because this RFP does not seek a turnkey purchase proposal, we believe the second section of the Price Proposal Form (page 1) is not relevant. If the City is interested in a turnkey purchase proposal outside of this RFP, ReVision Energy will provide such a proposal upon request.

Information requested in the first section of Price Proposal Form (page 1) can be found in Section B of this response to RFP as well as in the attached Site Maps. Information requested in the Price Proposal Form (page 2) can be found in Section J of this response to RFP.

91 West Main Street
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(207) 589-4171

142 Presumpscot Street
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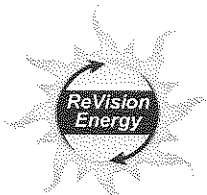
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Professional design, installation and service of solar energy systems

PROPOSAL FORM

POWER PURCHASE AGREEMENT FOR SOLAR PHOTOVOLTAIC SYSTEMS RFP

#9215

**** THIS SHEET MUST BE INCLUDED IN YOUR PROPOSAL ****

The undersigned hereby declares that he/she or they are the only person(s), firm or corporation interested in this proposal as principal, that it is made without any connection with any other person(s), firm or corporation submitting a proposal for the same, and that no person acting for or employed by the City of Portland is directly or indirectly interested in this proposal or in any anticipated profits which may be derived there from.

The undersigned hereby declares that they have read and understand all conditions as outlined in this Request for Proposals, and that the proposal is made in accordance with the same.

The bidder acknowledges the receipt of Addenda numbered: 9215 Addendum 1

COMPANY NAME: ReVision Energy, LLC

PRINT NAME & TITLE: Fortunat Mueller, Co-Founder and Managing Partner

ADDRESS: 142 Presumpscot Street, Portland, ME 04103

E-MAIL ADDRESS: fortunat@revisionenergy.com

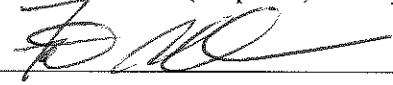
PHONE NUMBER: (207) 221-6342 FAX NUMBER: (207) 589-4174

TYPE OF ORGANIZATION - PARTNERSHIP, CORPORATION, INDIVIDUAL, OTHER:

Limited Liability Company

STATE OF INCORPORATION, IF APPLICABLE: Maine

FEDERAL TAX IDENTIFICATION NUMBER (Required): TIN: 26-1825324

AUTHORIZED SIGNATURE: 

DATE: 8-20-15

NOTE: Proposals must bear the handwritten signature of a duly authorized member or employee of the organization submitting a proposal.

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**CITY OF PORTLAND, MAINE
POWER PURCHASE AGREEMENT FOR SOLAR PHOTOVOLTAIC SYSTEMS
RFP #9215**

DATE: July 31, 2015

The attention of firms submitting proposals for the work named in the above Invitation is called to the following modifications to the documents as were issued.

The items set forth herein, whether of clarification, omission, addition and/or substitution, shall be included and form a part of the Contractor's submitted material and the corresponding Contract when executed. No claim for additional compensation, due to lack of knowledge of the contents of this Addendum will be considered.

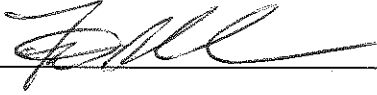
**ALL BIDDERS ARE ADVISED THAT RECEIPT OF THIS NOTICE MUST BE DULY
ACKNOWLEDGED ON THE BID PROPOSAL FORM OR BY THE INSERTION OF
THIS SHEET, SIGNED, AND SUBMITTED WITH YOUR PROPOSAL.**

**MATT FITZGERALD
PURCHASING MANAGER**

The RFP opening is being moved out from Thursday, August 6, 2015 at 3:00 p.m., to Thursday, August 20, 2015 at 3:00 p.m. Please find on the following page our response to follow-up questions that arose at the site visit on Thursday, July 16 as well as a list of attendees.

Receipt of Addendum No. 1 to the City of Portland's RFP #9215 **POWER PURCHASE
AGREEMENT FOR SOLAR PHOTOVOLTAIC SYSTEMS** is hereby acknowledged.

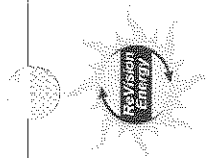
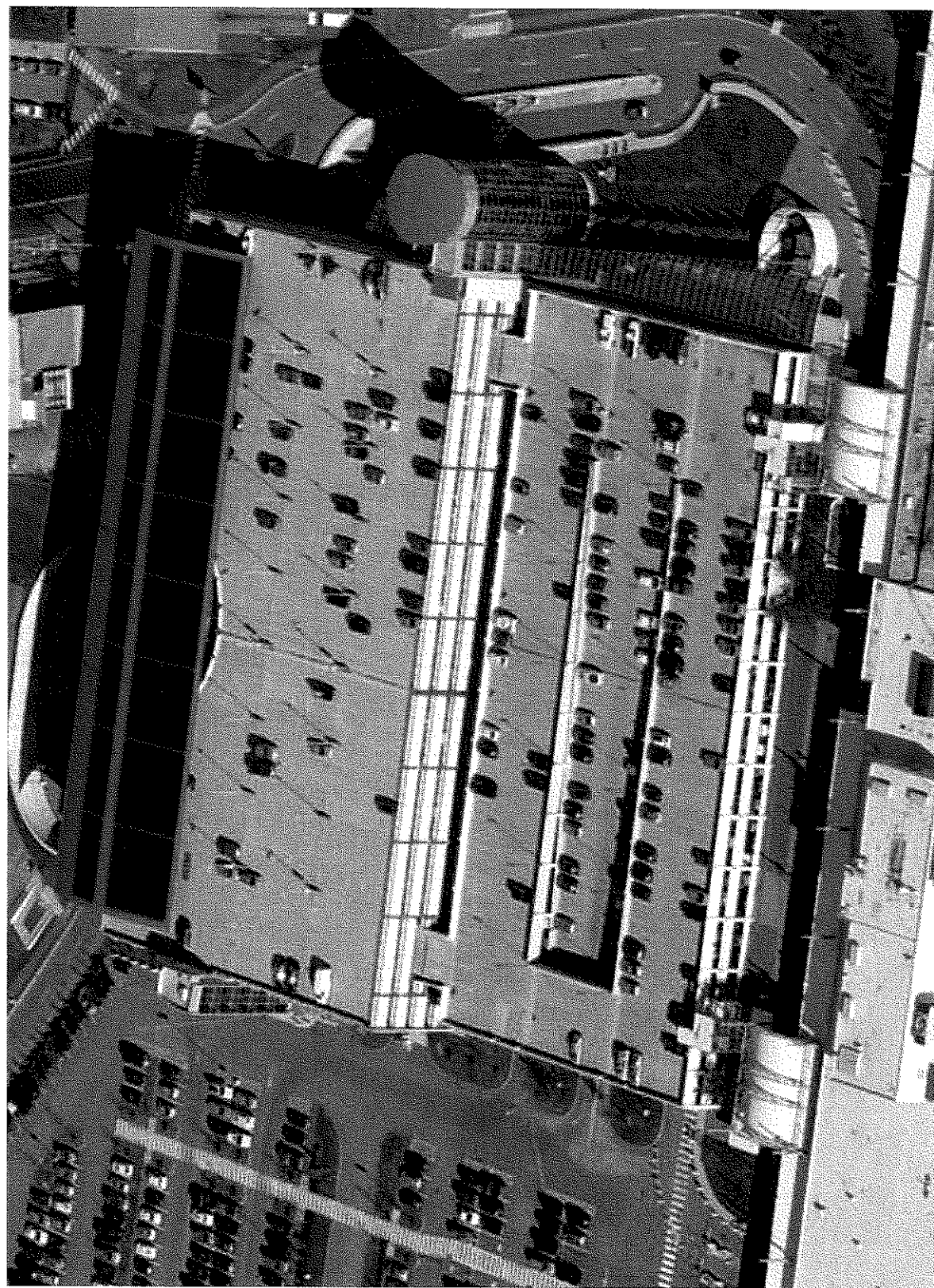
COMPANY NAME: ReVision Energy, LLC

SIGNED BY: 

DATE: 8/20/15

PRINT NAME & TITLE: Fortunat Mueller, Co-Founder & Managing Member

ADDRESS: 142 Presumpscot Street, Portland, ME 04102



142 Presumpscot Street
Portland, ME 04103
(207) 221-6342

Project Information

PWM Jetport Garage Canopy
1001 Westbrook Street
Portland, ME 04102

System Type:

324.48 kWdc Photovoltaic Array

Drawing Name:

Rendering of PV Array

Page:	1 of 3
Drawn By:	L. Brestak
Date:	August 20, 2015
Rev. Number:	0

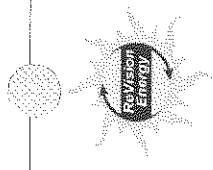
Project Design Notes:

Preliminary Design Plan, Not for Construction

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Professional Engineer Stamp of Approval:



142 Presumpscot Street
Portland, ME 04103
(207) 221-6342

Project Information

PWM Jetport Garage Canopy
1001 Westbrook Street
Portland, ME 04102

System Type:

324.48 kW_{dc} Photovoltaic Array

Drawing Name:

Site Map & Roof Layout (1)

Page:	2 of 3
Drawn By:	L. Brodek
Date:	August 20, 2016
Rev. Number:	0

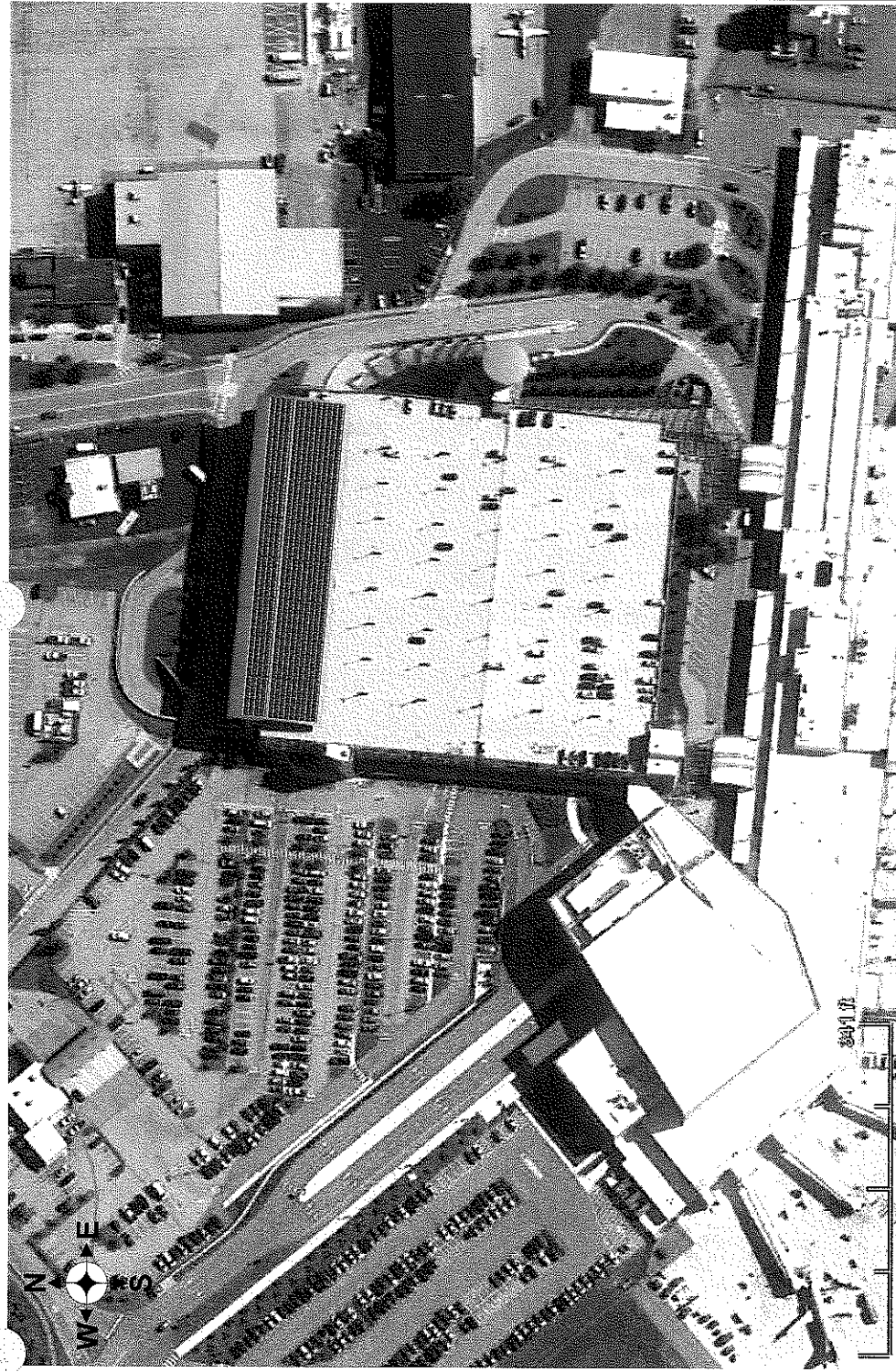
Project Design Notes:

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Racking System: Roof Mount, Flush
Wind Rating of Mounting System: 120 mph
Dead Load of Solar Array: 2.75 psf

Array Tilt: from 14° to 1° (rounded roof)
Array Azimuth: 185° (Southside)
Array Azimuth: 5° (Northside)

Array Dimensions: 327'-1½" x 73'-2¾"
Roof Dimensions: 340'-0" x 106'-0"

Thermal Expansion Gaps:
1'-0" between subarrays, as shown

Total AC System Size:

(10) 24kW Inverters, 240 kW_{AC}

Inverter Type and Specifications:

SMA STP 24000TL-US-10
Max AC Power per Inverter: 24 kW_{AC}
Max AC Output Current per Inverter: 29A
Nominal AC Voltage: 480 / 277 V WYE

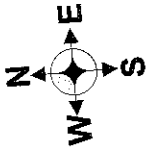
Total DC System Size: 324.48 kW_{dc}

1248 Modules in Portrait, 13 Rows of 96
9 Rows on South Face, 4 Rows on North Face

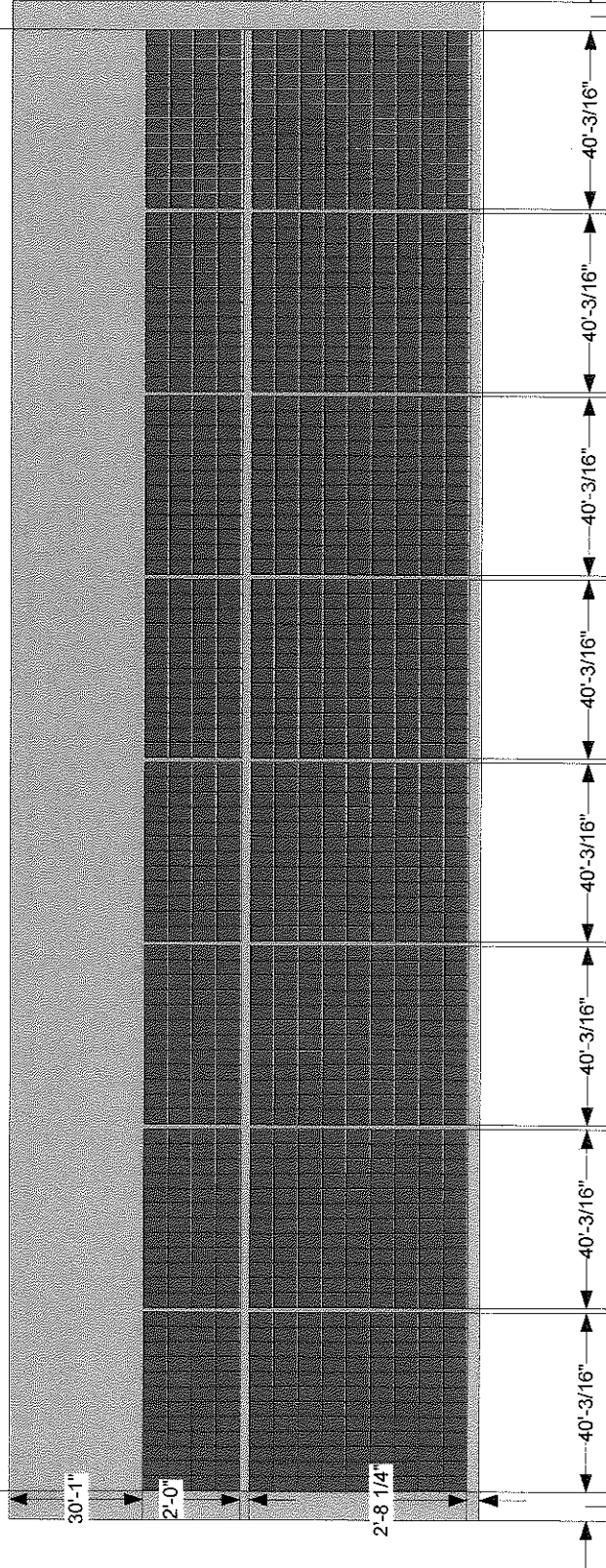
Module Type: Q Cell 260W Q.PRO BFR-G3
Module Dimensions: 65.75" x 39.37" x 1.26"

First Year kWh Production: 349,789 kWh

Degradation Percentage: 0.5% per year



327'-1 1/2"



6'-5 1/4"

6'-5 1/4"

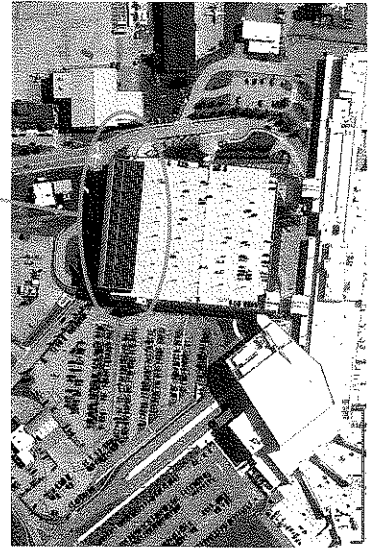
Racking System: Roof Mount, Flush
Wind Rating of Mounting System: 120 mph
Dead Load of Solar Array: 2.75 psf

9 Rows on South Face, 4 Rows on North Face,
with 2'-0" gap in between

Array Tilt: from 14° to 1° (barrel roof)
Array Azimuth: 185° (Southside)
Array Azimuth: 5° (Northside)

Array Dimensions: 327'-1 1/2" x 73'-2 3/4"
Roof Dimensions: 340'-0" x 106'-0"

Thermal Expansion Gaps:
1'-0" between subarrays, as shown



142 Presumpscot Street
Portland, ME 04103
(207) 221-6342

Project Information

PWM Jetport Garage Canopy
1001 Westbrook Street
Portland, ME 04102

System Type

324.48 kWdc Photovoltaic Array

Drawing Name:

Site Map & Roof Layout (2)

Page:	3 of 3
Drawn By:	L. Brodek
Date:	August 20, 2015
Rev. Number:	0

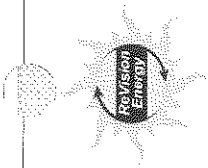
Project Design Notes:

Preliminary Design Plan, Not for Construction

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Professional Engineer Stamp of Approval



142 Presumpscot Street
Portland, ME 04103
(207) 221-5342

Project Information

King Middle School
92 Deering Avenue
Portland, ME 04102

System Type:

301.60 kW_{dc} Photovoltaic Array

Drawing Name:

Site Map (1)

Page: 1 of 2

Drawn By: L. Break

Date: August 20, 2015

Rev Number: 0

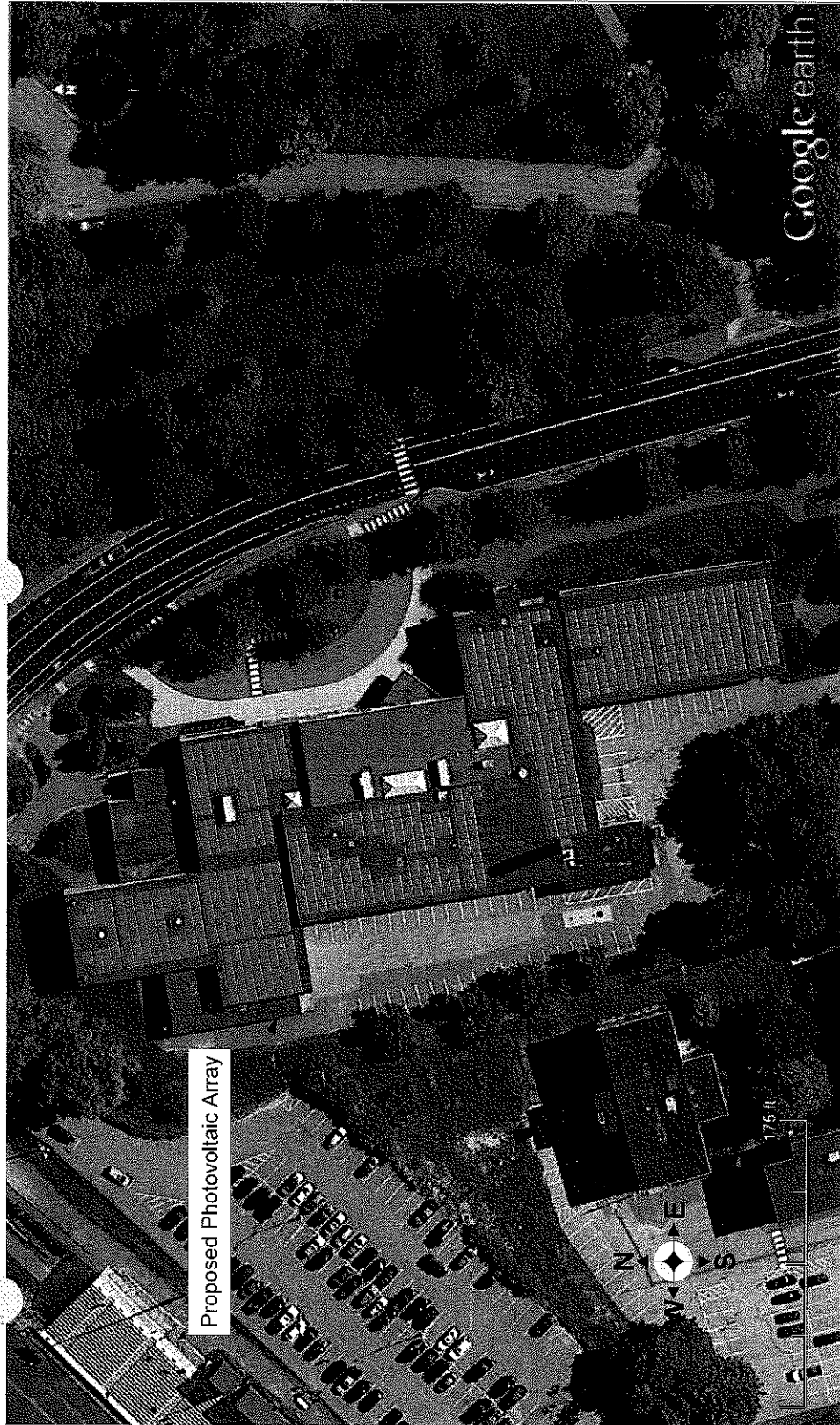
Project Design Notes:

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Proposed Photovoltaic Array

Total DC System Size: 301.60 kW_{dc}

1160 Modules in Portrait, in East-West Layout
580 facing East, 580 facing West

Module Type: Q Cell 260W Q.PRO BFR-G3
Module Dimensions: 65.75" x 39.37" x 1.26"

First Year kWh Production: 317,461 kWh

Degradation Percentage: 0.5% per year

Total AC System Size:

(9) 24kW Inverters, 216 kW_{ac}

Inverter Type and Specifications:

SMA STP 24000TL-US-10

Max AC Power per Inverter: 24 kWAC

Max AC Output Current per Inverter: 29A

Nominal AC Voltage: 480 / 277 V WYE

Racking System: Roof Mount, East-West Racking
Wind Rating of Mounting System: 120 mph
Dead Load of Solar Array: 5 psf (average)

Array Tilt: 10° Array Azimuth: 260° / 80°

Setback from Roof Edges: 6'-0"

Service Walkways: 3'-0" between subarrays



142 Presumpscot Street
Portland, ME 04103
(207) 221-6342

Project Information

King Middle School
92 Deering Avenue
Portland, ME 04102

System Type:

301.60 kWac Photovoltaic Array

Drawing Name:

Roof Mount Profile:
East-West Racking System

Page: 2 of 2

Drawn By: L. Brostek

Date: August 20, 2015

Rev. Number: 0

Project Design Notes:

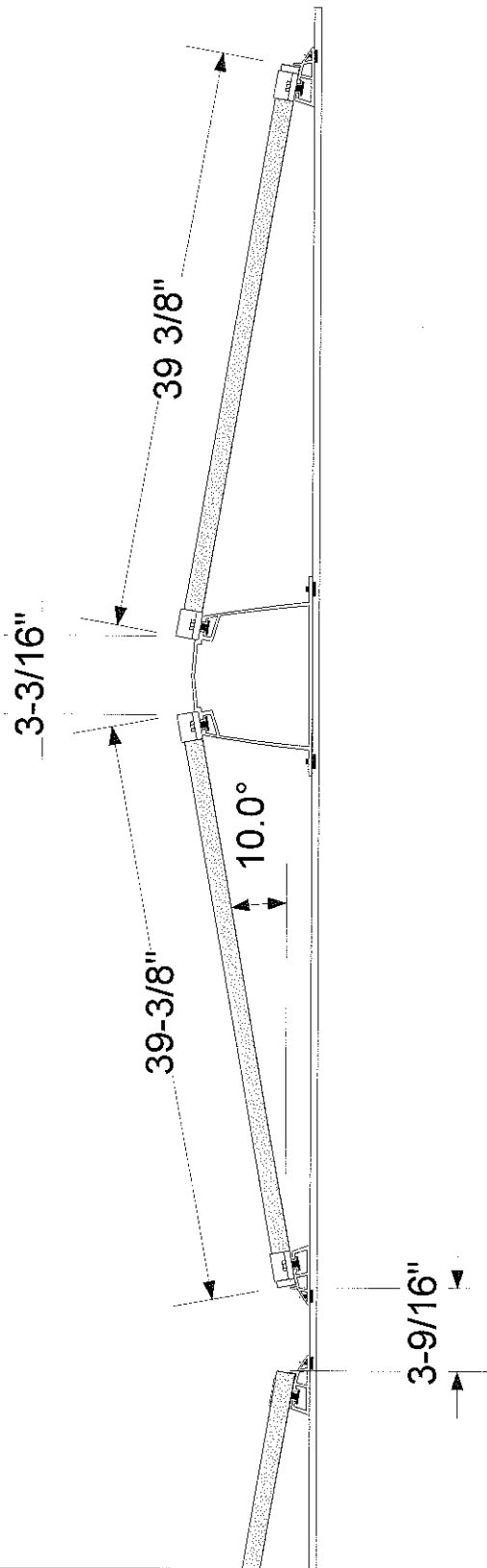
Preliminary Design Plan, Not for Construction

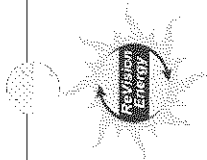
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Professional Engineer Stamp of Approval

Dimensions of Photovoltaic Array, Roof Mount Racking System, East-West, Profile View:





142 Presumpscot Street
Portland, ME 04103
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Project Information

Portland Arts & Technology High School
196 Allen Avenue
Portland, ME 04103

System Type:

244.40 kW_{dc} Photovoltaic Array

Drawing Name:

Site Map (1)

Page: 1 of 2
Drawn By: L. Blotek
Date: August 20, 2015
Rev. Number: 0

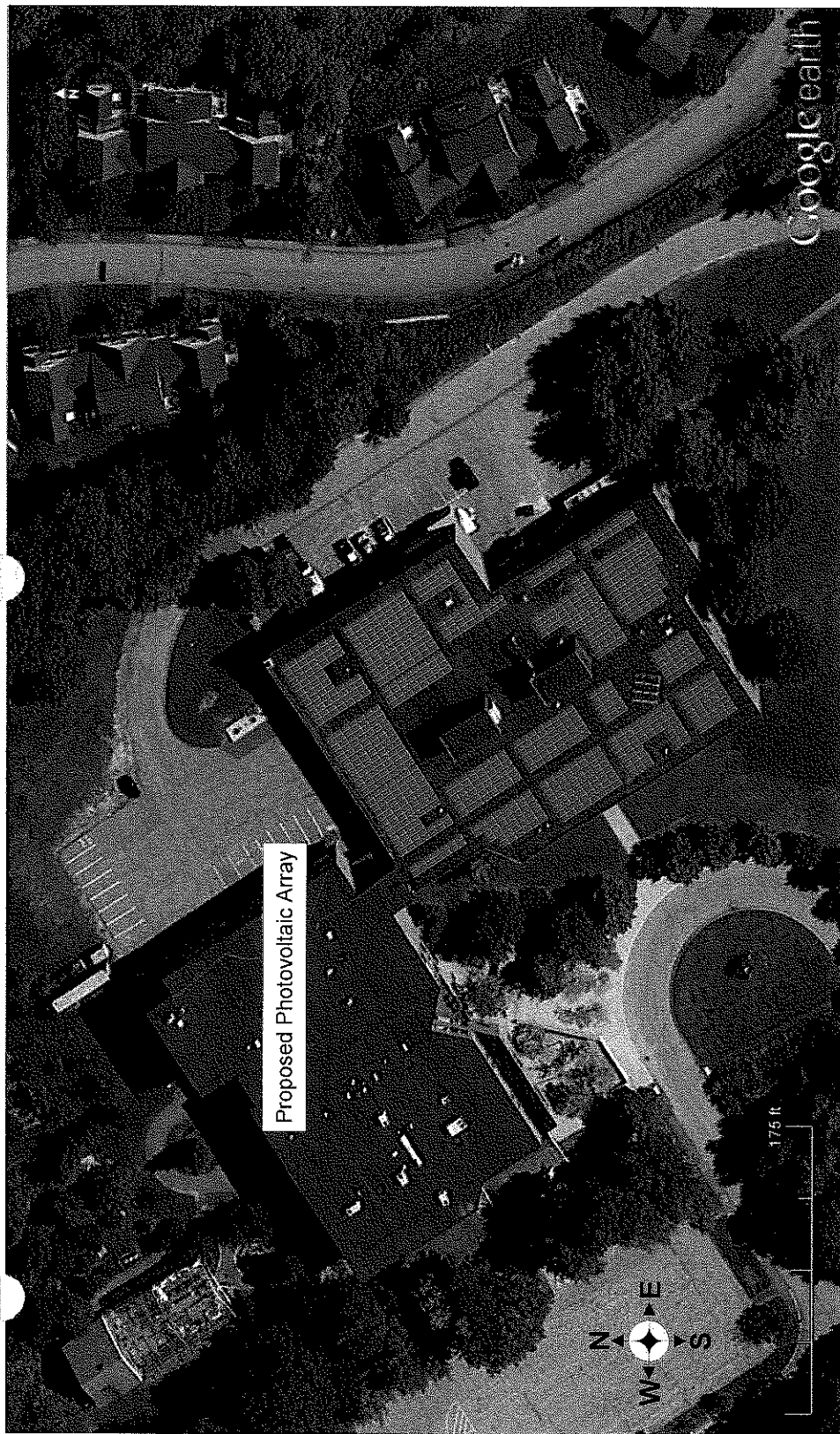
Project Design Notes:

Preliminary Design Plan, Not for Construction

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Professional Engineer Stamp of Approval:



Total DC System Size: 244.40 kW_{dc}

940 Modules in Portrait, in East-West Layout
470 facing East, 470 facing West

Module Type: Q Cell 260W Q.PRO BFR-G3
Module Dimensions: 65.75" x 39.37" x 1.26"

First Year kWh Production: 257,046 kWh

Degradation Percentage: 0.5% per year

Total AC System Size:

(7) 24kW Inverters, 168 kW_{ac}

Inverter Type and Specifications:

SMA STP 24000TL-US-10

Max AC Power per Inverter: 24 kWAC

Max AC Output Current per Inverter: 29A

Nominal AC Voltage: 480 / 277 V WYE

Racking System: Roof Mount, East-West Racking

Wind Rating of Mounting System: 120 mph

Dead Load of Solar Array: 5 psf (average)

Array Tilt: 10° Array Azimuth: 238° / 58°

Setback from Roof Edges: 6'-0"

Service Walkways: 3'-0" between subarrays
(minimum)



142 Presumpscot Street
Portland, ME 04103
(207) 221-6342

Project Information

Portland Arts & Technology High School
196 Allen Avenue
Portland, ME 04103

System Type:

244.40 kWdc Photovoltaic Array

Drawing Name:

Roof Mount Profile:
East-West Racking System

Page:	2 of 2
Drawn By:	L. Brodek
Date:	August 20, 2015
Rev. Number:	0

Project Design Notes:

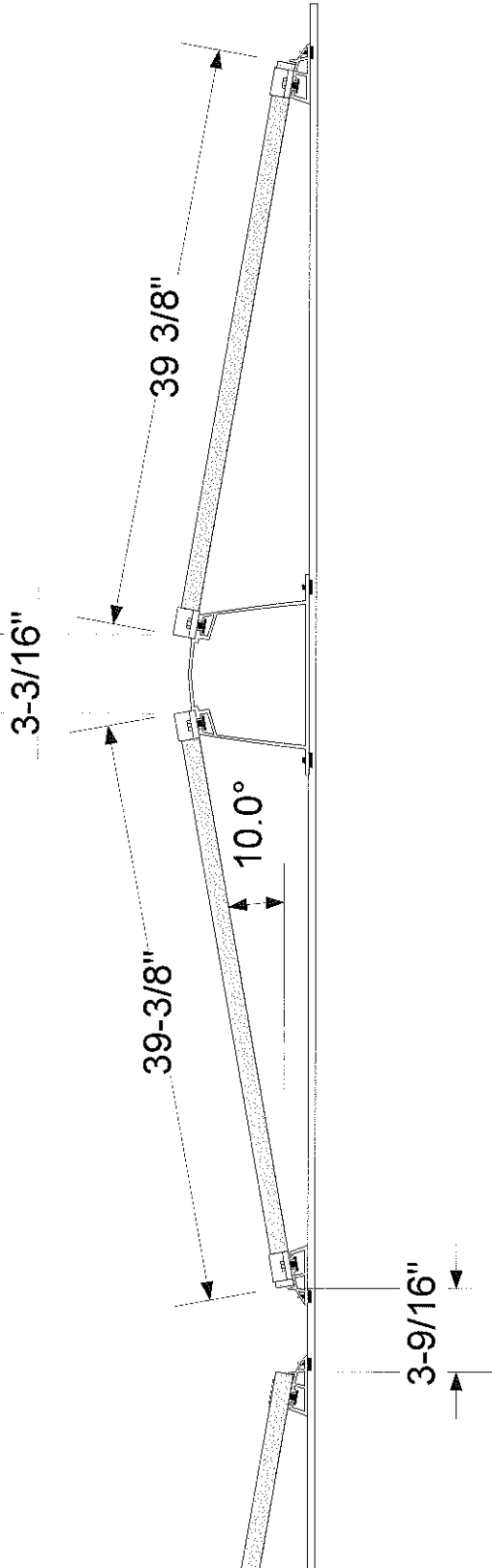
Preliminary Design Plan, Not for Construction

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Professional Engineer Stamp of Approval

Dimensions of Photovoltaic Array, Roof Mount Racking System, East-West, Profile View:





142 Presumpscot Street
Portland, ME 04103
(207) 221-6342

Project Information

Portland Library Storage Facility
1000 Riverside Street
Portland, ME 04103

System Type:

89.28 kW_{dc} Photovoltaic Array

Drawing Name:

Site Map & Roof Layout (1)

Page: 1 of 2
Drawn By: L. Brodsky
Date: August 20, 2015
Rev. Number: 0

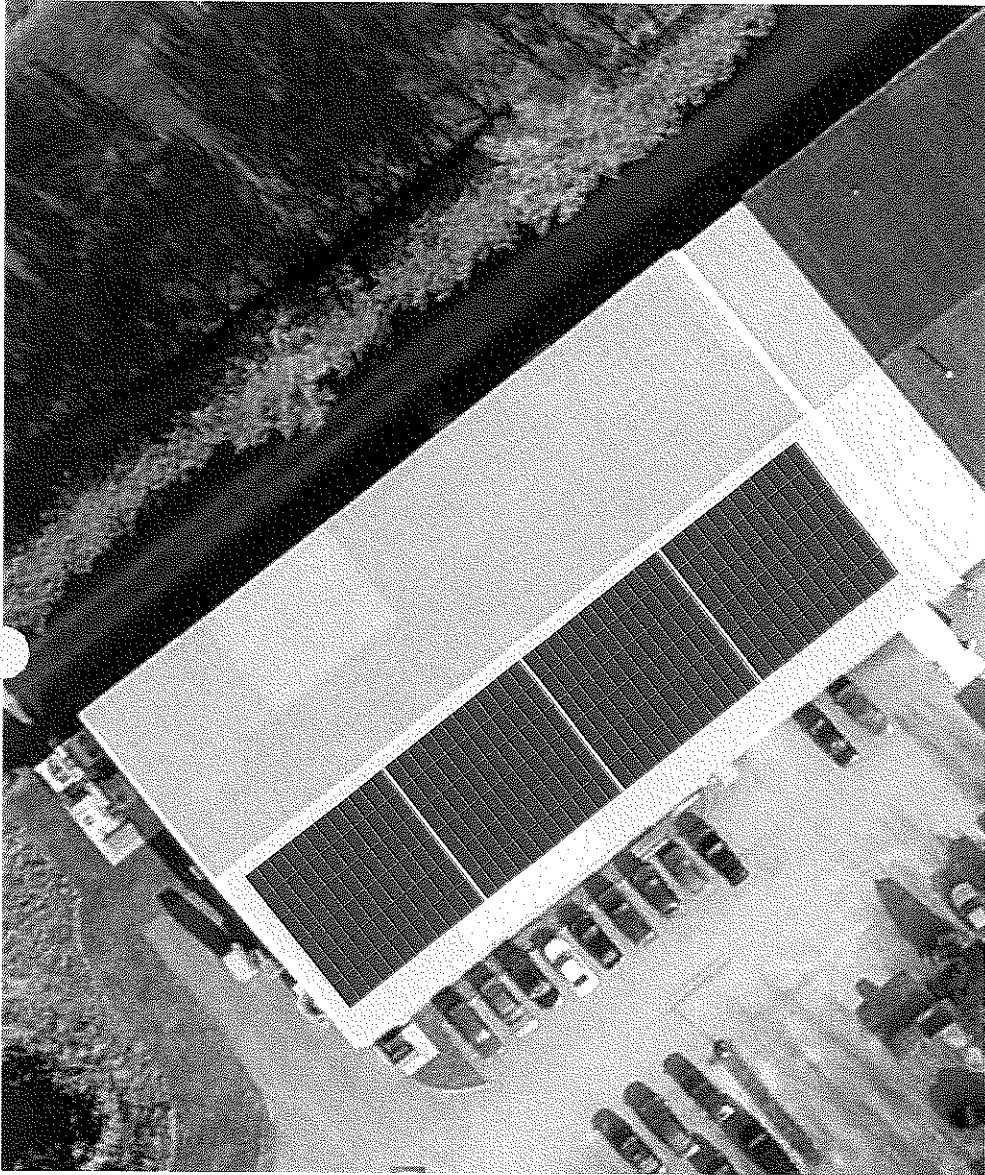
Project Design Notes:

Preliminary Design Plan. Not for Construction

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Professional Engineer Stamp of Approval



Total AC System Size:

(3) 24kW Inverters, 72 kW_{ac}

Inverter Type and Specifications:

SMA STP 24000TL-US-10

Max AC Power per Inverter: 24 kWAC

Max AC Output Current per Inverter: 29A

Nominal AC Voltage: 480 / 277 V WYE

Total DC System Size: 89.28 kW_{dc}

288 Modules in Portrait, 6 Rows of 48

Module Type: ReneSola 310W JC310M-24/Ab

Module Dimensions: 77.01" x 39.06" x 1.57"

First Year kWh Production: 97,180 kWh

Degradation Percentage: 0.5% per year

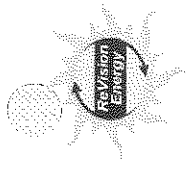
Racking System: Roof Mount, Flush
Wind Rating of Mounting System: 120 mph
Dead Load of Solar Array: 2.75 psf

Array Tilt: 5° Array Azimuth: 231°

Array Dimensions: 161'-11 13/16" x 38'-6"

Roof Dimensions: 175'-0" x 50'-0"

Thermal Expansion Gaps:
1'-0" between subarrays, as shown



142 Presumpscot Street
Portland, ME 04103
(207) 221-6342

Project Information

Portland Library Storage Facility
1000 Riverside Street
Portland, ME 04103

System Type:

89.28 kWdc Photovoltaic Array

Drawing Name:

Site Map & Roof Layout (2)

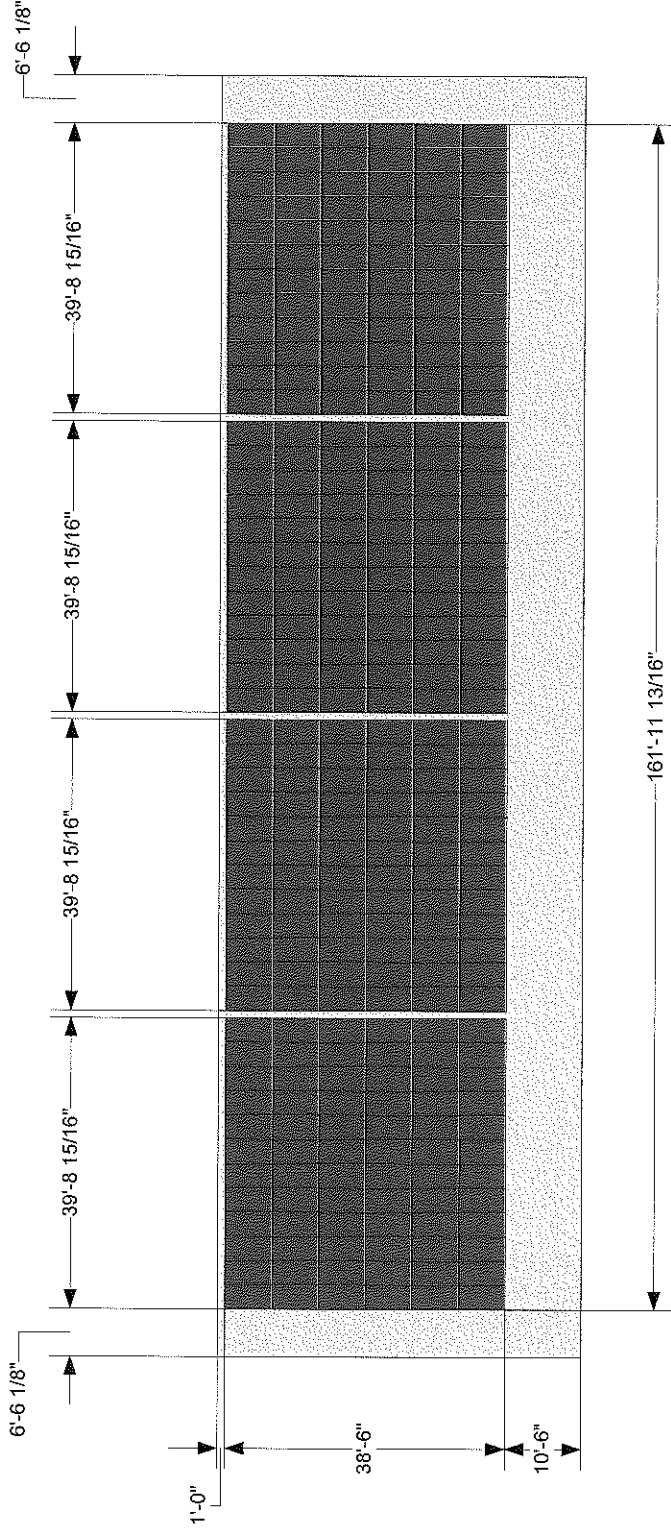
Page:	2 of 2
Drawn By:	L. Brodeur
Date:	August 20, 2015
Rev. Number:	0
Project Design Notes:	

Preliminary Design Plan, Not for Construction

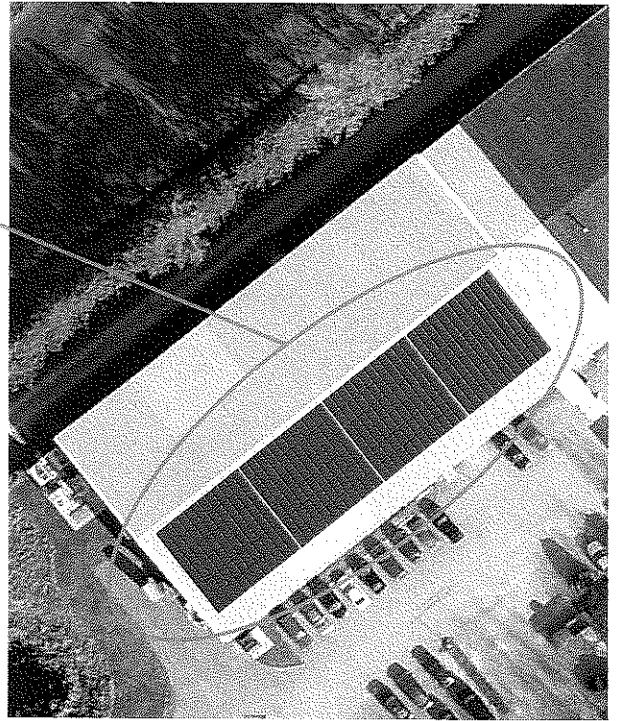
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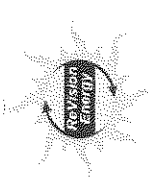
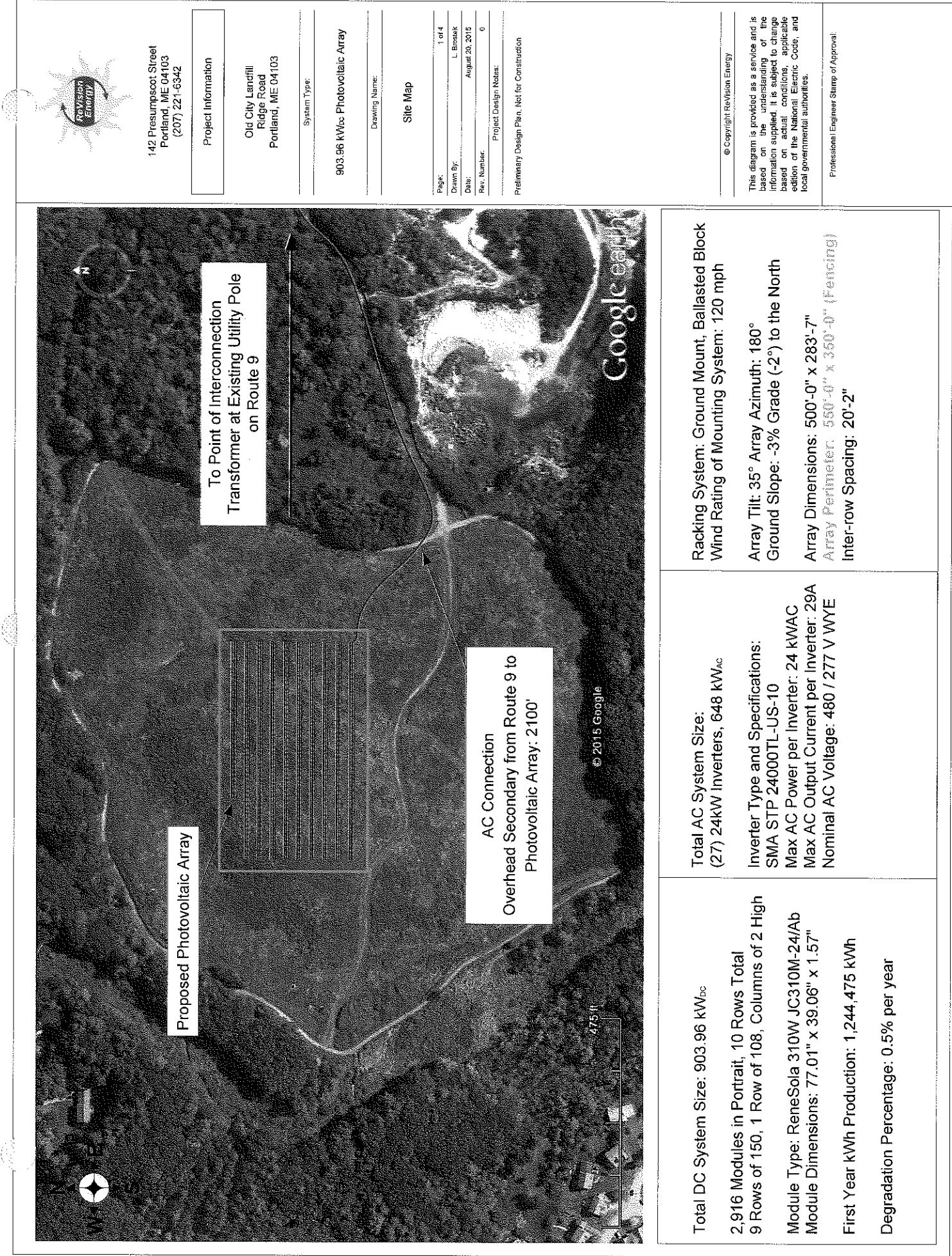
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Racking System: Roof Mount, Flush
Wind Rating of Mounting System: 120 mph
Dead Load of Solar Array: 2.75 psf
Array Tilt: 5° Array Azimuth: 231°
Array Dimensions: 161'-11 13/16" x 38'-6"
Roof Dimensions: 175'-0" x 50'-0"
Thermal Expansion Gaps:
1'-0" between subarrays, as shown
PV Rail installed in alignment with purlins
(not shown).





142 Presumpscot Street
Portland, ME 04103
(207) 221-6342

Project Information

Old City Landfill
Ridge Road
Portland, ME 04103

System Type:

903.96 kW_{dc} Photovoltaic Array

Drawing Name:

Site Map

Page:	1 of 4
Drawn By:	L. Bessick
Date:	August 20, 2015
Rev. Number:	0

Project Design Notes:

Preliminary Design Plan, Not for Construction

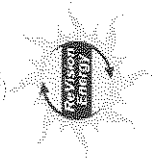
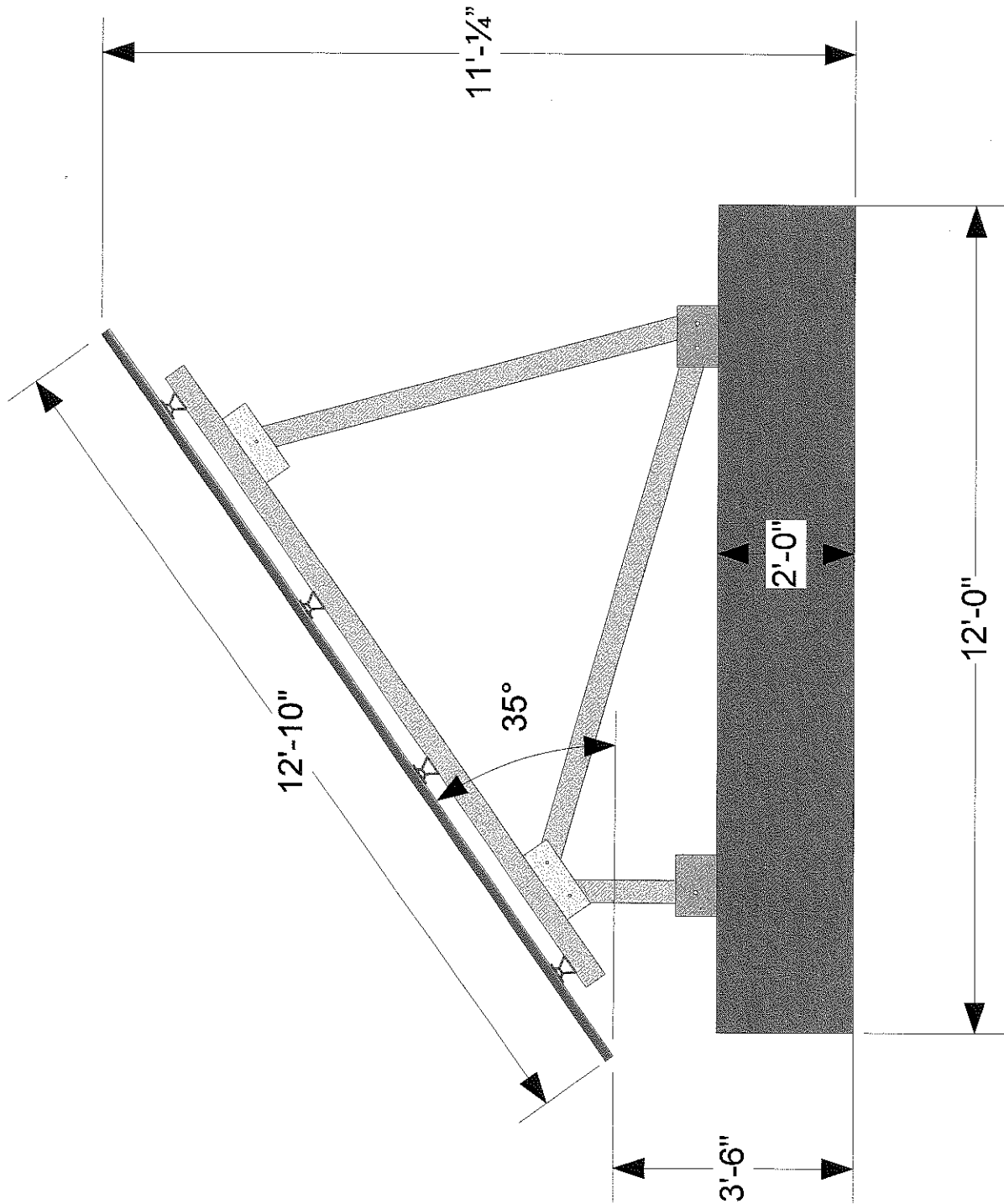
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Total DC System Size: 903.96 kW_{dc} 2,916 Modules in Portrait, 10 Rows Total 9 Rows of 150, 1 Row of 108, Columns of 2 High Module Type: ReneSola 310W JC310M-24/Ab Module Dimensions: 77.01" x 39.06" x 1.57" First Year kWh Production: 1,244,475 kWh Degradation Percentage: 0.5% per year	Total AC System Size: (27) 24kW Inverters, 648 kW_{ac} Inverter Type and Specifications: SMA STP 24000TL-US-10 Max AC Power per Inverter: 24 kWAC Max AC Output Current per Inverter: 29A Nominal AC Voltage: 480 / 277 V WYE	Racking System: Ground Mount, Ballasted Block Wind Rating of Mounting System: 120 mph Array Tilt: 35° Array Azimuth: 180° Ground Slope: -3% Grade (-2°) to the North Array Dimensions: 500'-0" x 283'-7" Array Perimeter: 550'-0" x 350'-0" (Fencing) Inter-row Spacing: 20'-2"
--	---	---

Dimensions of Photovoltaic Array, Ground Mount Racking System, Side View:



142 Presumpscot Street
Portland, ME 04103
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Project Information

Old City Landfill
Ridge Road
Portland, ME 04103

System Type:

903.96 kWdc Photovoltaic Array

Drawing Name:

Ground Mount Profile:
Ballasted Block Racking System

Page:	2 of 4
Drawn By:	L. Bosalak
Date:	August 20, 2015
Rev. Number:	0

Project Design Notes:

Preliminary Design Plan, Not for Construction
2,918 Modules in Portrait, 10 Rows Total
9 Rows of 150, 1 Row of 108, Columns of 2 High
Module Type: Renesola 310W-JC310M-24/Ab
Module Dimensions: 77.01" x 39.09" x 1.57"
Racking System: Ground Mount, Ballasted Block
Wind Rating of Mounting System: 120 mph
Array Tilt: 35° Array Azimuth: 180° (True)
Concrete Ballasted Blocks
Leaving Edge: 3'-6" from ground

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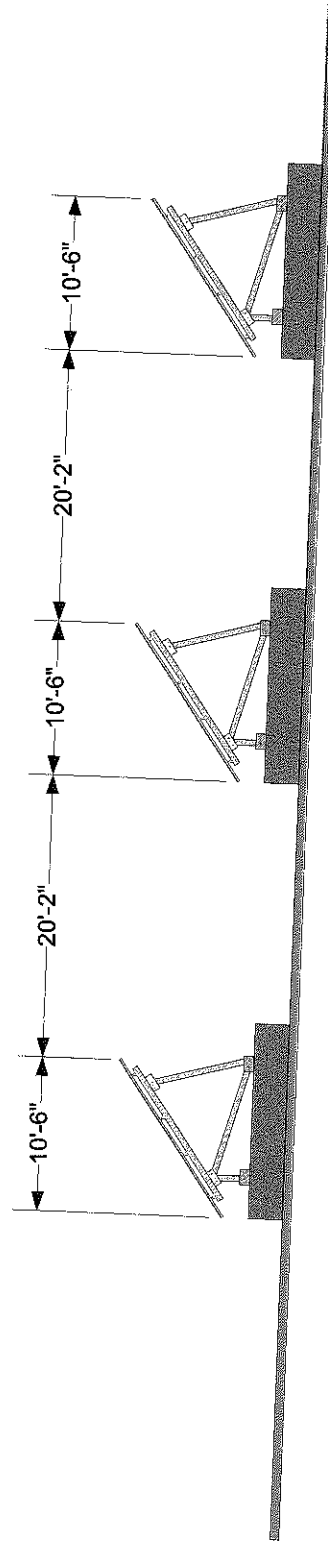
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Inter-row Spacing Requirement (Shadow Distance):

To eliminate shading during peak sun hours, distance between rows shall be a minimum of 20'-2" from the top of the front panel to the bottom of the back panel. Shading calculations are based on the sun's position and altitude angle over Portland, ME on Winter Solstice (21 December).

23.0°

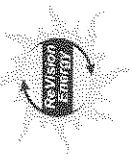


Ground Slope = -3% (-2°)

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142 Presumpscot Street
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Project Information

Old City Landfill
Ridge Road
Portland, ME 04103

System Type:

903.96 kWdc Photovoltaic Array

Drawing Name:

Inter-Row Spacing Requirements

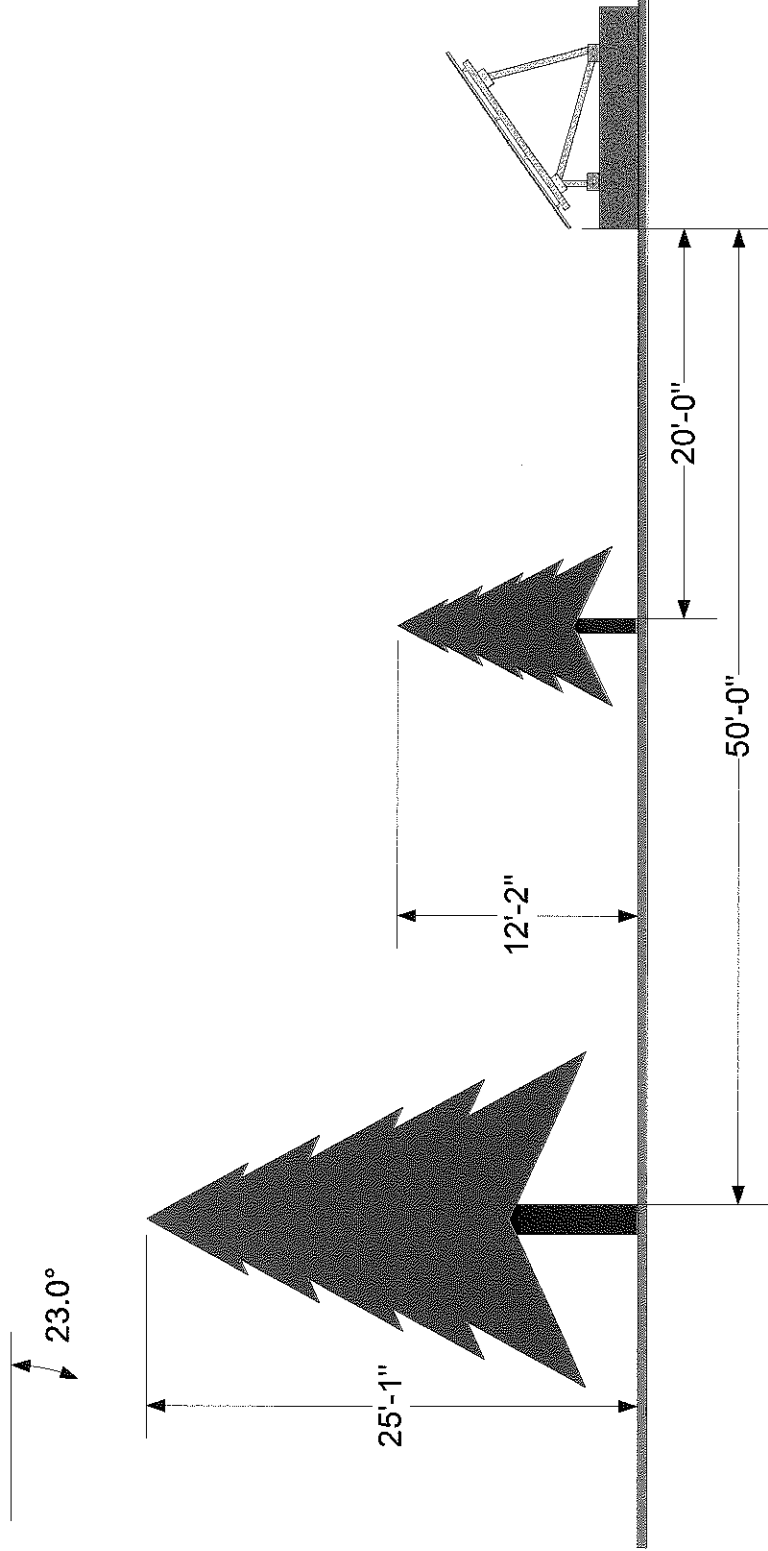
Page: 3 of 4
Drawn By: L. Brasiek
Date: August 20, 2015
Rev. Number: 0

Project Design Notes:

Preliminary Design Plan, Not for Construction
Module Type: Renaissance 310W UC310M-24/Ab
Module Dimensions: 77.01" x 39.05" x 1.57"
Racking System: Ground Mount, Ballasted Block
Wind Rating of Mounting System: 120 mph
Array Tilt: 35° Array Azimuth: 180°
Ground Slope: -3% Grade (-2°) to the North
Array Dimensions: 50'-0" x 293'-7"
Inter-row Spacing: 20'-2"

Irradiance Spacing (Shade-free Zone):

Keeping the solar array shade-free optimizes annual energy production. Shade elimination requires a zone that extends from the East, South, and West edges of the array that is free of any obstacles (buildings, vegetation, or other) that would cast a shadow. This irradiance spacing varies with height and distance as shown.



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(207) 221-6342

Project Information

Old City Landfill
Ridge Road
Portland, ME 04103

System Type:

903.96 kWdc Photovoltaic Array

Drawing Name:

Irradiance Shading

Page: 4 of 4
Drawn By: L. Brooks
Date: August 20, 2015
Rev. Number: 0

Project Design Notes:

Preliminary Design Plan, Not for Construction
Module Type: ReneSola 310W UC310M-24/46b
Module Dimensions: 77.01" x 39.08" x 1.57"
Racking System: Ground Mount, Ballasted Block
Wind Rating of Mounting System: 120 mph
Array Tilt: 35° Array Azimuth: 180°
Ground Slope: -3% Grade (-2°) to the North
Array Dimensions: 500'-0" x 283'-7"
Inter-row Spacing: 20'-2"

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RESULTS

1,185 kWh per Year *

Month	Solar Radiation (kWh / m ² / day)	AC Energy (kWh)	Energy Value (\$)
January	2.59	64	4
February	3.74	83	6
March	4.56	110	8
April	5.19	117	8
May	5.78	132	9
June	6.09	130	9
July	6.30	136	9
August	5.67	124	9
September	4.79	104	7
October	3.64	82	6
November	2.36	54	4
December	2.06	51	4
Annual	4.39	1,187	\$ 83

User Comments

Jetport Parking Canopy, South-facing 1 (in kWh / kW per year)

Location and Station Identification

Requested Location	portland me
Weather Data Source	(TMY2) PORTLAND, ME 2.4 mi
Latitude	43.65° N
Longitude	70.32° W

PV System Specifications (Residential)

DC System Size	1 kW
Module Type	Standard
Array Type	Fixed (roof mount)
Array Tilt	14°
Array Azimuth	185°
System Losses	20.95%
Inverter Efficiency	96%
DC to AC Size Ratio	1.35

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.07 \$/kWh
Initial Cost	3.30 \$/Wdc



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RESULTS

1,128 kWh per Year *

Month	Solar Radiation (kWh / m ² / day)	AC Energy (kWh)	Energy Value (\$)
January	2.25	55	4
February	3.39	75	5
March	4.30	104	7
April	5.04	114	8
May	5.72	131	9
June	6.09	130	9
July	6.25	135	9
August	5.52	121	8
September	4.55	98	7
October	3.24	74	5
November	2.10	48	3
December	1.79	44	3
Annual	4.19	1,129	\$ 77

User Comments

Jetport Parking Canopy, South-facing 2 (in kWh / kW per year)

Location and Station Identification

Requested Location	portland me
Weather Data Source	(TMY2) PORTLAND, ME 2.4 mi
Latitude	43.65° N
Longitude	70.32° W

PV System Specifications (Residential)

DC System Size	1 kW
Module Type	Standard
Array Type	Fixed (roof mount)
Array Tilt	7°
Array Azimuth	185°
System Losses	20.95%
Inverter Efficiency	96%
DC to AC Size Ratio	1.35

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.07 \$/kWh
Initial Cost	3.30 \$/Wdc

Warning: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at <http://sam.nrel.gov>) that allow for more precise and complex modeling of PV systems.

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RESULTS

1,068 kWh per Year *

Month	Solar Radiation (kWh / m ² / day)	AC Energy (kWh)	Energy Value (\$)
January	1.94	46	3
February	3.06	67	5
March	4.04	97	7
April	4.87	110	8
May	5.63	129	9
June	6.04	129	9
July	6.16	133	9
August	5.34	117	8
September	4.30	93	6
October	2.94	67	5
November	1.86	42	3
December	1.55	37	3
Annual	3.98	1,067	\$ 75

User Comments

Jetport Parking Canopy, South-facing 3 (in kWh / kW per year)

Location and Station Identification

Requested Location	portland me
Weather Data Source	(TMY2) PORTLAND, ME 2.4 mi
Latitude	43.65° N
Longitude	70.32° W

PV System Specifications (Residential)

DC System Size	1 kW
Module Type	Standard
Array Type	Fixed (roof mount)
Array Tilt	1°
Array Azimuth	185°
System Losses	20.95%
Inverter Efficiency	96%
DC to AC Size Ratio	1.35

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.07 \$/kWh
Initial Cost	3.30 \$/Wdc

Warning: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at <http://sam.nrel.gov>) that allow for more precise and complex modeling of PV systems.

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RESULTS

979 kWh per Year *

Month	Solar Radiation (kWh / m ² / day)	AC Energy (kWh)	Energy Value (\$)
January	1.52	35	2
February	2.60	56	4
March	3.66	88	6
April	4.61	104	7
May	5.46	126	9
June	5.93	127	9
July	6.00	130	9
August	5.07	111	8
September	3.94	85	6
October	2.54	57	4
November	1.53	33	2
December	1.21	27	2
Annual	3.67	979	\$ 68

User Comments

Jetport Parking Canopy, North-facing 1 (in kWh / kW per year)

Location and Station Identification

Requested Location	portland me
Weather Data Source	(TMY2) PORTLAND, ME 2.4 mi
Latitude	43.65° N
Longitude	70.32° W

PV System Specifications (Residential)

DC System Size	1 kW
Module Type	Standard
Array Type	Fixed (roof mount)
Array Tilt	7°
Array Azimuth	5°
System Losses	20.95%
Inverter Efficiency	96%
DC to AC Size Ratio	1.35

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.07 \$/kWh
Initial Cost	3.30 \$/Wdc



ution: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at <http://sam.nrel.gov>) that allow for more precise and complex modeling of PV systems.

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RESULTS

1,046 kWh per Year *

Month	Solar Radiation (kWh / m ² / day)	AC Energy (kWh)	Energy Value (\$)
January	1.83	43	3
February	2.95	64	4
March	3.95	95	7
April	4.81	109	8
May	5.59	128	9
June	6.02	129	9
July	6.12	132	9
August	5.28	116	8
September	4.21	91	6
October	2.84	65	4
November	1.78	40	3
December	1.46	34	2
Annual	3.90	1,046	\$ 72

User Comments

Jetport Parking Canopy, North-facing 2 (in kWh / kW per year)

Location and Station Identification

Requested Location	portland me
Weather Data Source	(TMY2) PORTLAND, ME 2.4 mi
Latitude	43.65° N
Longitude	70.32° W

PV System Specifications (Residential)

DC System Size	1 kW
Module Type	Standard
Array Type	Fixed (roof mount)
Array Tilt	1°
Array Azimuth	5°
System Losses	20.95%
Inverter Efficiency	96%
DC to AC Size Ratio	1.35

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.07 \$/kWh
Initial Cost	3.30 \$/Wdc

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RESULTS

156,120 kWh per Year *

Month	Solar Radiation (kWh / m ² / day)	AC Energy (kWh)	Energy Value (\$)
January	1.80	6,428	446
February	2.86	9,443	655
March	3.91	14,216	987
April	4.75	16,205	1,125
May	5.55	19,242	1,335
June	5.94	19,157	1,329
July	6.08	19,830	1,376
August	5.19	17,148	1,190
September	4.19	13,707	951
October	2.81	9,699	673
November	1.74	5,882	408
December	1.45	5,163	358
Annual	3.86	156,120	\$ 10,833

User Comments

King Middle School, East, Portland ME

Location and Station Identification

Requested Location	portland me
Weather Data Source	(TMY2) PORTLAND, ME 2.4 mi
Latitude	43.65° N
Longitude	70.32° W

PV System Specifications (Residential)

DC System Size	150.8 kW
Module Type	Standard
Array Type	Fixed (roof mount)
Array Tilt	10°
Array Azimuth	80°
System Losses	20.95%
Inverter Efficiency	96%
DC to AC Size Ratio	1.40

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.07 \$/kWh
Initial Cost	3.30 \$/Wdc



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RESULTS

161,341 kWh per Year *

Month	Solar Radiation (kWh / m ² / day)	AC Energy (kWh)	Energy Value (\$)
January	1.97	7,091	492
February	3.13	10,373	720
March	4.03	14,641	1,016
April	4.87	16,591	1,151
May	5.59	19,354	1,343
June	6.04	19,460	1,351
July	6.12	19,947	1,384
August	5.36	17,733	1,231
September	4.27	13,930	967
October	2.96	10,228	710
November	1.88	6,402	444
December	1.55	5,590	388
Annual	3.98	161,340	\$ 11,197

User Comments

King Middle School, West, Portland ME

Location and Station Identification

Requested Location	portland me
Weather Data Source	(TMY2) PORTLAND, ME 2.4 mi
Latitude	43.65° N
Longitude	70.32° W

PV System Specifications (Residential)

DC System Size	150.8 kW
Module Type	Standard
Array Type	Fixed (roof mount)
Array Tilt	10°
Array Azimuth	260°
System Losses	20.95%
Inverter Efficiency	96%
DC to AC Size Ratio	1.40

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.07 \$/kWh
Initial Cost	3.30 \$/Wdc



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RESULTS

121,813 kWh per Year *

Month	Solar Radiation (kWh / m ² / day)	AC Energy (kWh)	Energy Value (\$)
January	1.61	4,586	318
February	2.67	7,082	492
March	3.74	11,001	763
April	4.64	12,825	890
May	5.48	15,405	1,069
June	5.91	15,439	1,071
July	6.01	15,905	1,104
August	5.07	13,603	944
September	4.03	10,659	740
October	2.63	7,306	507
November	1.60	4,321	300
December	1.30	3,680	255
Annual	3.72	121,812	\$ 8,453

User Comments

Portland Arts & Technology High School, East, Portland ME

Location and Station Identification

Requested Location	portland me
Weather Data Source	(TMY2) PORTLAND, ME 2.4 mi
Latitude	43.65° N
Longitude	70.32° W

PV System Specifications (Residential)

DC System Size	122.2 kW
Module Type	Standard
Array Type	Fixed (roof mount)
Array Tilt	10°
Array Azimuth	58°
System Losses	20.95%
Inverter Efficiency	96%
DC to AC Size Ratio	1.45

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.07 \$/kWh
Initial Cost	3.30 \$/Wdc



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RESULTS

135,233 kWh per Year *

Month	Solar Radiation (kWh / m ² / day)	AC Energy (kWh)	Energy Value (\$)
January	2.15	6,359	441
February	3.32	8,951	621
March	4.19	12,335	856
April	4.97	13,725	952
May	5.66	15,858	1,101
June	6.08	15,843	1,100
July	6.19	16,327	1,133
August	5.47	14,652	1,017
September	4.43	11,714	813
October	3.13	8,812	612
November	2.02	5,629	391
December	1.70	5,028	349
Annual	4.11	135,233	\$ 9,386

User Comments

Portland Arts & Technology High School, West, Portland ME

Location and Station Identification

Requested Location	portland me
Weather Data Source	(TMY2) PORTLAND, ME 2.4 mi
Latitude	43.65° N
Longitude	70.32° W

PV System Specifications (Residential)

DC System Size	122.2 kW
Module Type	Standard
Array Type	Fixed (roof mount)
Array Tilt	10°
Array Azimuth	238°
System Losses	20.95%
Inverter Efficiency	96%
DC to AC Size Ratio	1.45

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.07 \$/kWh
Initial Cost	3.30 \$/Wdc



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RESULTS

97,180 kWh per Year *

Month	Solar Radiation (kWh / m ² / day)	AC Energy (kWh)	Energy Value (\$)
January	2.05	4,380	304
February	3.20	6,267	435
March	4.13	8,865	615
April	4.93	9,943	690
May	5.66	11,584	804
June	6.07	11,568	803
July	6.19	11,928	828
August	5.42	10,588	735
September	4.37	8,441	586
October	3.05	6,226	432
November	1.95	3,916	272
December	1.63	3,471	241
Annual	4.05	97,177	\$ 6,745

User Comments

Library Storage Facility, Portland ME

Location and Station Identification

Requested Location	portland me
Weather Data Source	(TMY2) PORTLAND, ME 2.4 mi
Latitude	43.65° N
Longitude	70.32° W

PV System Specifications (Residential)

DC System Size	89.28 kW
Module Type	Standard
Array Type	Fixed (roof mount)
Array Tilt	5°
Array Azimuth	231°
System Losses	20.95%
Inverter Efficiency	96%
DC to AC Size Ratio	1.24

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.07 \$/kWh
Initial Cost	3.30 \$/Wdc



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RESULTS

1,244,475 kWh per Year *

Month	Solar Radiation (kWh / m ² / day)	AC Energy (kWh)	Energy Value (\$)
January	3.41	83,747	5,812
February	4.51	96,039	6,665
March	5.03	113,249	7,859
April	5.27	115,176	7,993
May	5.57	124,788	8,660
June	5.69	119,512	8,294
July	6.02	127,997	8,883
August	5.71	122,472	8,500
September	5.18	109,917	7,628
October	4.20	95,740	6,644
November	2.96	68,087	4,725
December	2.73	67,751	4,702
Annual	4.69	1,244,475	\$ 86,365

User Comments

Old City Landfill, Portland ME

Location and Station Identification

Requested Location	portland me
Weather Data Source	(TMY2) PORTLAND, ME 2.4 mi
Latitude	43.65° N
Longitude	70.32° W

PV System Specifications (Residential)

DC System Size	903.96 kW
Module Type	Standard
Array Type	Fixed (open rack)
Array Tilt	35°
Array Azimuth	180°
System Losses	14%
Inverter Efficiency	96%
DC to AC Size Ratio	1.395

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.07 \$/kWh
Initial Cost	3.30 \$/Wdc

ID	Task Mode	Task Name	Duration	Start	Finish	July	August	September	October	November	December	January	February	March	April
1		RFP Response Submitted	0 days	Thu 8/20/15	Thu 8/20/15										
2		RFP Awarded to ReVision	14 days	Thu 8/20/15	Tue 9/8/15										
3		Finalize Project Designs	14 days	Wed 9/9/15	Mon 9/28/15										
4		PE Structural Review	21 days	Tue 9/29/15	Tue 10/27/15										
5		Negotiate PPA Contract	14 days	Wed 10/28/15	Mon 11/16/15										
6		Negotiate EPC Contract	14 days	Tue 11/17/15	Fri 12/4/15										
7		Procure Major System Components	28 days	Mon 12/7/15	Wed 1/13/16										
8		Interconnection Approval	28 days	Mon 12/7/15	Wed 1/13/16										
9		Building Electrical Permit Approval	28 days	Mon 12/7/15	Wed 1/13/16										
10		Project Construction	42 days	Thu 1/14/16	Fri 3/11/16										
11		Building/Electrical Inspection	7 days	Mon 3/14/16	Tue 3/22/16										
12		CMP Witness Test	7 days	Wed 3/23/16	Thu 3/31/16										
13		Commercial Operations	0 days	Thu 3/31/16	Thu 3/31/16										

3/31

Project: Roof Mounts- City of P Date: Wed 8/19/15		Task	Inactive Summary	External Tasks
Split		Manual Task		External Milestone
Milestone		Duration-only		Deadline
Summary		Manual Summary Rollup		Progress
Project Summary		Manual Summary		Manual Progress
Inactive Task		Start-only		
Inactive Milestone		Finish-only		

ID	Task Mode	Task Name	Duration	Start	Finish	July	August	September	October	November	December	January	February	March	April	May	June	July	August
1	Task	RFP Response Submitted	0 days	Thu 8/20/15	Thu 8/20/15														
2	Task	RFP Awarded to ReVision	14 days	Thu 8/20/15	Tue 9/8/15														
3	Task	DEP Approval	21 days	Tue 8/18/15	Tue 9/15/15														
4	Task	Finalize Project Design	14 days	Wed 9/9/15	Mon 9/28/15														
5	Task	Negotiate PPA Contract	14 days	Wed 9/16/15	Mon 10/5/15														
6	Task	Negotiate EPC Contract	14 days	Wed 9/16/15	Mon 10/5/15														
7	Task	Interconnection Approval	28 days	Tue 8/18/15	Thu 9/24/15														
8	Task	Building/Electrical Permit Approval	28 days	Tue 8/18/15	Thu 9/24/15														
9	Task	Procure Major System Components	28 days	Tue 3/15/16	Thu 4/21/16														
10	Task	Project Construction	42 days	Fri 4/22/16	Mon 6/20/16														
11	Task	Building/Electrical Inspection	7 days	Tue 6/21/16	Wed 6/29/16														
12	Task	CMP Witness Test	7 days	Thu 6/30/16	Fri 7/8/16														
13	Task	Commercial Operations	0 days	Fri 7/8/16	Fri 7/8/16														

Project: Landfill - City of Portlan Date: Wed 8/19/15	Task	Project Summary	Manual Task	Start-only	Deadline
	Split	Inactive Task	Duration-only	Finish-only	Progress
	Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
	Summary	Inactive Summary	Manual Summary	External Milestone	

City of Portland –Distributed Generation

Year 1 Purchase Vs. Year 7 Purchase

Portland Year 1 Purchase						
Year	Portland Bond PMT	Operating Expenses	REC Value	Utility Bill	Annual Savings	Cumulative Savings
1	\$ (171,651)	\$ (20,895)	\$ 38,712	\$ 86,762	\$ (67,072)	\$ (67,072)
2	\$ (171,651)	\$ (19,937)	\$ 38,518	\$ 89,350	\$ (63,721)	\$ (130,793)
3	\$ (171,651)	\$ (19,028)	\$ 38,325	\$ 92,015	\$ (60,339)	\$ (191,132)
4	\$ (171,651)	\$ (18,164)	\$ 38,133	\$ 94,759	\$ (56,923)	\$ (248,055)
5	\$ (171,651)	\$ (17,343)	\$ 37,942	\$ 97,585	\$ (53,467)	\$ (301,522)
6	\$ (171,651)	\$ (16,563)	\$ 37,752	\$ 100,496	\$ (49,967)	\$ (351,489)
7	\$ (171,651)	\$ (27,340)	\$ 37,563	\$ 103,493	\$ (57,935)	\$ (409,424)
8	\$ (171,651)	\$ (26,636)	\$ 37,374	\$ 106,580	\$ (54,333)	\$ (463,757)
9	\$ (171,651)	\$ (25,968)	\$ 37,187	\$ 109,758	\$ (50,674)	\$ (514,431)
10	\$ (171,651)	\$ (25,334)	\$ -	\$ 113,032	\$ (83,953)	\$ (598,383)
11	\$ (171,651)	\$ (24,731)	\$ -	\$ 116,403	\$ (79,979)	\$ (678,362)
12	\$ (171,651)	\$ (24,158)	\$ -	\$ 119,875	\$ (75,935)	\$ (754,297)
13	\$ (171,651)	\$ (23,615)	\$ -	\$ 123,450	\$ (71,816)	\$ (826,113)
14	\$ (171,651)	\$ (23,098)	\$ -	\$ 127,132	\$ (67,617)	\$ (893,730)
15	\$ (171,651)	\$ (22,608)	\$ -	\$ 130,924	\$ (63,335)	\$ (957,066)
16	\$ (171,651)	\$ (20,642)	\$ -	\$ 134,828	\$ (57,465)	\$ (1,014,530)
17	\$ (171,651)	\$ (20,200)	\$ -	\$ 138,850	\$ (53,001)	\$ (1,067,532)
18	\$ (171,651)	\$ (19,780)	\$ -	\$ 142,991	\$ (48,440)	\$ (1,115,972)
19	\$ (171,651)	\$ (19,381)	\$ -	\$ 147,256	\$ (43,776)	\$ (1,159,748)
20	\$ (171,651)	\$ (19,002)	\$ -	\$ 151,648	\$ (39,006)	\$ (1,198,754)
Total Net Savings					\$ (1,198,754)	

Portland Year 7 Purchase						
Year	Portland PPA/Bond PMT	Operating Expenses	REC Value	Utility Bill	Annual Savings	Cumulative Savings
1	\$ (131,674)	\$ -	\$ -	\$ 86,762	\$ (44,912)	\$ (44,912)
2	\$ (133,636)	\$ -	\$ -	\$ 89,350	\$ (44,286)	\$ (89,199)
3	\$ (135,627)	\$ -	\$ -	\$ 92,015	\$ (43,613)	\$ (132,811)
4	\$ (137,648)	\$ -	\$ -	\$ 94,759	\$ (42,889)	\$ (175,701)
5	\$ (139,699)	\$ -	\$ -	\$ 97,585	\$ (42,114)	\$ (217,815)
6	\$ (141,781)	\$ -	\$ -	\$ 100,496	\$ (41,285)	\$ (259,100)
7	\$ (124,659)	\$ (27,340)	\$ 37,563	\$ 103,493	\$ (10,943)	\$ (270,043)
8	\$ (124,659)	\$ (26,636)	\$ 37,374	\$ 106,580	\$ (7,341)	\$ (277,384)
9	\$ (124,659)	\$ (25,968)	\$ 37,187	\$ 109,758	\$ (3,681)	\$ (281,065)
10	\$ (124,659)	\$ (25,334)	\$ -	\$ 113,032	\$ (36,960)	\$ (318,025)
11	\$ (124,659)	\$ (24,731)	\$ -	\$ 116,403	\$ (32,987)	\$ (351,012)
12	\$ (124,659)	\$ (24,158)	\$ -	\$ 119,875	\$ (28,942)	\$ (379,954)
13	\$ (124,659)	\$ (23,615)	\$ -	\$ 123,450	\$ (24,823)	\$ (404,778)
14	\$ (124,659)	\$ (23,098)	\$ -	\$ 127,132	\$ (20,625)	\$ (425,403)
15	\$ (124,659)	\$ (22,608)	\$ -	\$ 130,924	\$ (16,343)	\$ (441,746)
16	\$ (124,659)	\$ (20,642)	\$ -	\$ 134,828	\$ (10,473)	\$ (452,219)
17	\$ (124,659)	\$ (20,200)	\$ -	\$ 138,850	\$ (6,009)	\$ (458,228)
18	\$ (124,659)	\$ (19,780)	\$ -	\$ 142,991	\$ (1,448)	\$ (459,675)
19	\$ (124,659)	\$ (19,381)	\$ -	\$ 147,256	\$ 3,216	\$ (456,459)
20	\$ (124,659)	\$ (19,002)	\$ -	\$ 151,648	\$ 7,987	\$ (448,473)
Total Net Savings					\$ (448,473)	

Proposals Assume an Annual 3.5% Utility Rate Increase

Bond Assumptions: 20 Year Amortization Schedule @ 3.5%

City of Portland -Landfill

Year 1 Purchase Vs. Year 7 Purchase

Portland Year 1 Purchase						
Year	Portland Bond PMT	Operating Expenses	REC Value	Utility Bill	Annual Savings	Cumulative Savings
1	\$ (195,581)	\$ (31,779)	\$ 47,214	\$ 105,780	\$ (74,366)	\$ (74,366)
2	\$ (195,581)	\$ (30,877)	\$ 46,978	\$ 108,935	\$ (70,545)	\$ (144,911)
3	\$ (195,581)	\$ (30,020)	\$ 46,742	\$ 112,184	\$ (66,675)	\$ (211,586)
4	\$ (195,581)	\$ (29,207)	\$ 46,508	\$ 115,530	\$ (62,749)	\$ (274,335)
5	\$ (195,581)	\$ (28,434)	\$ 46,275	\$ 118,976	\$ (58,764)	\$ (333,099)
6	\$ (195,581)	\$ (27,700)	\$ 46,044	\$ 122,524	\$ (54,713)	\$ (387,811)
7	\$ (195,581)	\$ (37,850)	\$ 45,813	\$ 126,179	\$ (61,439)	\$ (449,250)
8	\$ (195,581)	\$ (37,187)	\$ 45,584	\$ 129,942	\$ (57,243)	\$ (506,493)
9	\$ (195,581)	\$ (36,558)	\$ 45,355	\$ 133,817	\$ (52,967)	\$ (559,460)
10	\$ (195,581)	\$ (35,961)	\$ -	\$ 137,809	\$ (93,733)	\$ (653,193)
11	\$ (195,581)	\$ (35,393)	\$ -	\$ 141,919	\$ (89,055)	\$ (742,248)
12	\$ (195,581)	\$ (34,854)	\$ -	\$ 146,151	\$ (84,284)	\$ (826,532)
13	\$ (195,581)	\$ (34,342)	\$ -	\$ 150,510	\$ (79,413)	\$ (905,945)
14	\$ (195,581)	\$ (33,856)	\$ -	\$ 154,999	\$ (74,438)	\$ (980,382)
15	\$ (195,581)	\$ (33,394)	\$ -	\$ 159,622	\$ (69,353)	\$ (1,049,735)
16	\$ (195,581)	\$ (31,456)	\$ -	\$ 164,383	\$ (62,654)	\$ (1,112,389)
17	\$ (195,581)	\$ (31,039)	\$ -	\$ 169,286	\$ (57,335)	\$ (1,169,724)
18	\$ (195,581)	\$ (30,644)	\$ -	\$ 174,335	\$ (51,890)	\$ (1,221,614)
19	\$ (195,581)	\$ (30,268)	\$ -	\$ 179,534	\$ (46,315)	\$ (1,267,929)
20	\$ (195,581)	\$ (29,911)	\$ -	\$ 184,889	\$ (40,604)	\$ (1,308,532)
Total Net Savings					\$ (1,308,532)	

Portland Year 7 Purchase						
Year	Portland PPA/Bond PMT	Operating Expenses	REC Value	Utility Bill	Annual Savings	Cumulative Savings
1	\$ (143,115)	\$ -	\$ -	\$ 105,780	\$ (37,334)	\$ (37,334)
2	\$ (145,247)	\$ -	\$ -	\$ 108,935	\$ (36,312)	\$ (73,646)
3	\$ (147,411)	\$ -	\$ -	\$ 112,184	\$ (35,227)	\$ (108,873)
4	\$ (149,608)	\$ -	\$ -	\$ 115,530	\$ (34,077)	\$ (142,950)
5	\$ (151,837)	\$ -	\$ -	\$ 118,976	\$ (32,861)	\$ (175,811)
6	\$ (154,099)	\$ -	\$ -	\$ 122,524	\$ (31,575)	\$ (207,386)
7	\$ (143,614)	\$ (37,850)	\$ 45,813	\$ 126,179	\$ (9,472)	\$ (216,858)
8	\$ (143,614)	\$ (37,187)	\$ 45,584	\$ 129,942	\$ (5,276)	\$ (222,134)
9	\$ (143,614)	\$ (36,558)	\$ 45,355	\$ 133,817	\$ (999)	\$ (223,134)
10	\$ (143,614)	\$ (35,961)	\$ -	\$ 137,809	\$ (41,766)	\$ (264,900)
11	\$ (143,614)	\$ (35,393)	\$ -	\$ 141,919	\$ (37,088)	\$ (301,988)
12	\$ (143,614)	\$ (34,854)	\$ -	\$ 146,151	\$ (32,317)	\$ (334,305)
13	\$ (143,614)	\$ (34,342)	\$ -	\$ 150,510	\$ (27,446)	\$ (361,750)
14	\$ (143,614)	\$ (33,856)	\$ -	\$ 154,999	\$ (22,471)	\$ (384,221)
15	\$ (143,614)	\$ (33,394)	\$ -	\$ 159,622	\$ (17,386)	\$ (401,607)
16	\$ (143,614)	\$ (31,456)	\$ -	\$ 164,383	\$ (10,687)	\$ (412,294)
17	\$ (143,614)	\$ (31,039)	\$ -	\$ 169,286	\$ (5,367)	\$ (417,661)
18	\$ (143,614)	\$ (30,644)	\$ -	\$ 174,335	\$ 77	\$ (417,584)
19	\$ (143,614)	\$ (30,268)	\$ -	\$ 179,534	\$ 5,652	\$ (411,932)
20	\$ (143,614)	\$ (29,911)	\$ -	\$ 184,889	\$ 11,363	\$ (400,569)
Total Net Savings					\$ (400,569)	

Proposals Assume an Annual 3.5% Utility Rate Increase

Bond Assumptions: 20 Year Amortization Schedule @ 3.5%



To: Chair Marshall and members of the Transportation, Sustainability and Energy Committee
 From: Troy Moon, Environmental Programs and Open Space Manager
 Re: Solar Project – Revision Energy Proposal
 Date: 11/13/2015

Earlier this year the City of Portland solicited proposals for vendors to install solar panels on city buildings in order to generate power for use by City facilities. The buildings included:

- Portland Jetport
- PATHS
- King Middle School
- Library Document Storage Facility
- Bramhall Fire Station

A mandatory pre-bid tour of facilities was attended by seven firms. Only one firm, ReVision Energy, submitted a bid.

The ReVision bid indicated that solar installations were feasible on four (4) of the buildings described in our RFP – only Bramhall was deemed unsuitable due to the relatively small surface area of the roof and a high level of shading. In addition to the rooftops, the ReVision bid included a proposal to develop a solar installation on the closed and capped Ocean Avenue Landfill. This location has been of interest to members of the community as a potential site of solar development. ReVision Energy agrees with this assessment and hopes to collaborate with the City on such a development.

If built out as described, the projects proposed have the ability to generate approximately 1.4 MWs (AC) of clean, renewable energy:

• PATHS	168 KW (AC)	256,795 KWh/year
• King MS	244 KW (AC)	317,010/KWh/year
• Jetport	240 KW (AC)	349,789 KWh/year
• Library Storage	72 KW (AC)	97,180 KWh/year
• Landfill	648 KW (AC)	1,244,475 KWh/year
• Combined totals	1,372 KW (AC)	2,265,249 KWh/year

Since the City (including schools) consumes approximately 35,600,000 KWh of electricity each year, the proposed project has the potential to generate a little more than 6% of our annual consumption.



City staff continues to review the details of the proposal and are in discussions with ReVision Energy regarding pricing and contractual details. Our initial review suggests that while the City would need to pay a modest premium for solar power in the short term, there could be significant long term benefit financially and environmentally if we move forward. On the financial side, the solar project is an investment in fixed cost renewable energy. As energy prices increase over time the cost of electricity from the grid will exceed the money invested in solar infrastructure. This will result in a net financial gain during the forty or more year expected life span of the solar panels. On the environmental front, the City will significantly reduce its carbon footprint by generating solar power. According to the US Energy Information Administration, burning natural gas to generate electricity produces 1.2 lbs of CO₂ per KWh. Since the Maine energy supply is largely generated using natural we can anticipate that the proposed solar project would reduce the City's green house gas emissions by more than 1,300 tons per year.

In this meeting we seek to acquaint the committee with this proposal and get feedback about it. We will be prepared to answer questions and anticipate a representative from ReVision to be present as well. Generation of renewable energy has long been identified as a goal of the City of Portland. We are excited to have a tangible proposal in front of us that may bring this to fruition.

PESTICIDE AND HERBICIDE USAGE ON CITY OWNED PROPERTY

1) *Purpose.* The purpose of this Section is to safeguard the health and welfare of the residents of the City of Portland and to conserve and protect the City's ground water, estuarine, marine and other natural resources, while ensuring preservation and enhancement of city owned land.

2) *Provisions.* The following provisions shall be applicable to all turf, landscape and outdoor pest management activities on city owned land.

(a) *Permitted:*

- i) Use or application of natural, organic land care protocols;
- ii) All control products and soil amendments, including fertilizer and compost, used under the terms of this article shall be in keeping with, but not limited to, products that can be used on Maine Organic Farmers and Gardeners Association Certified Farms, and/or products permitted by the Organic Materials Review Institute or the USDA National Organic Program;
- iii) Use or application of sludge or sludge-derived products to the extent permitted by the Maine Hazardous Waste, Septage and Solid Waste Management Act 38 M.R.S. §§1301-1319-Y, the Protection of Natural Resources Act 38 M.R.S. §§ 480-A-480-Z, the Site Location of Development Act 38 M.R.S. §§481-490, and any rules related thereto, as amended from time to time.

(b) *Prohibited:*

- i) Use or application of chemical pesticides, other than pesticides classified by the US Environmental Protection Agency as exempt materials under 40 CFR 152.25, and those products permitted by the Organic Materials Review Institute.
 - ii) Use or application of sludge or sludge-derived products not listed as permitted above.
- 3) *Definitions.* The following words, terms, and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

- (a) **Natural, organic land care:** An extension of the principles and practices of organic agriculture to the care of turf and landscape.
- (b) **Pesticide:** Any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest; any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant; and any nitrogen stabilizer. It does not include multicellular biological controls such as mites, nematodes, parasitic wasps, snails or other biological agents not regulated as pesticides by the U.S. Environmental Protection Agency. Herbicides, fungicides, insecticides and rodenticides are considered pesticides.
- (c) **Pesticide Application:** means the use or application of any pesticide by any method, including, but not limited to, broadcasting, drop spreading, fumigation, misting, soil injection and spraying.

(d) Sludge: Defined in 38 M.R.S. § 1303-C (28-A), as amended from time to time.

(e) City Owned Land: All land owned or leased by the City of Portland and/or managed by the City of Portland.

(f) Pest: Any undesirable insect, plant, fungi, bacteria, virus or micro-organism.

4) *Exemptions.*

(a) The following products are exempt from the prohibitions in 2(b) this Ordinance:

- (i) Pet Supplies such as shampoos, tick and flea collars and dusts;
- (ii) Disinfectants, germicides, bactericides, and virucides;
- (iii) Insect repellants;
- (iv) Outdoor animal repellants;
- (v) Swimming pool supplies;
- (vi) Aerosol products; and
- (vii) General use paints, stains and wood preservatives and sealants.

(b) The following processes are exempt from the prohibitions in 2(b) of this Ordinance:

- (i) Utility, and other routine vegetation maintenance programs, on utility rights of way, that run through the City of Portland;
- (ii) Drinking water and wastewater treatment;
- (iii) Indoor pesticide use;
- (iv) Contained baits or traps for rodent control;
- (v) Treatment of Golf Courses consistent with State and Federal regulations and pursuant to the *Best Management Practices for the Application of Turf Pesticides and Fertilizers* of the Maine Board of Pesticide Control. However, products prohibited by (2)(b) above shall not be permitted to be used or applied as part of such treatment within twenty-five (25) feet of any coastal waters, rivers, tributaries, streams or wetlands ;
- (vi) Treatment of Athletic Fields consistent with State and Federal regulations and pursuant to the *Best Management Practices for the Application of Turf Pesticides and Fertilizers* of the Maine Board of Pesticide Control. However, products prohibited by (2)(b) above shall not be permitted to be used or applied as part of such treatment within twenty-five (2) feet of any coastal waters, rivers, tributaries, streams or wetlands;
- (vii) Treatment of City Infrastructure including without limitation curb lines, medians, traffic islands, and utility rights of way consistent with State and Federal regulations and pursuant to the *Best Management Practices for the Application of Turf*

Pesticides and prohibited by treatment streams or

Fertilizers of the Maine Board of Pesticide Control. However, products (2)(b) above shall not be permitted to be used or applied as part of such within twenty-five (25) feet of any coastal waters, rivers, tributaries, wetlands ;

(viii) The control of noxious growth plants, including without limitation Poison Ivy, Poison Oak, and Poison Sumac;

(ix) Treatment of trees for Dutch Elm Disease as directed by the City Arborist;

(x) The control of invasive species that may be detrimental to the environment;

(xi) Use of pesticides mandated by state or federal law; and

(xii) The control of insects that are venomous or disease carrying.

5) *Emergency Waiver.* If an emergency situation warrants the use of non-exempt pesticides, the City Manager or his or her designee may grant a thirty (30) day temporary waiver. The waiver may be extended to a six (6) month total period. Waiver approval shall be subject to the use of the least toxic material available to address the given emergency.

6) *Commercial Applicators Certificate.*

(a) No person shall apply, advertise to apply or supervise the application of a pesticide, on or around any premises without first applying for and obtaining a registration certificate from the Park Manager as a pesticide applicator.

(b) *Exemption.* This subsection shall not apply to:

(i) The owner or occupant of a single, 2-family or multifamily dwelling of 12 or less units, if a pesticide is applied by a non-commercial applicator.

(ii) City Employees duly licensed by the Maine Board of Pesticides Control.

(c) *Application.* Registration forms for commercial pesticide applicator certificates shall be obtained from and returned to the Park Manager and shall contain the following information:

(i) Full name, address, date of birth and phone number of applicant;

(ii) Valid proof of certification as a commercial pesticide applicator under Federal and State law.

(d) *Certificate Issued.* Upon full and proper completion of the registration form, the Park Manager shall issue a commercial pesticide applicator registration certificate to the applicant. No pesticide applicator certificate is transferable.

(e) *Change of address.* Any change in the address of a pesticide applicator permittee shall be reported to the department within 60 days of the change.

(f) *Accidental Spill or Discharge.* In the event any pesticide spills or discharges accidentally, the person responsible for the spill or discharge shall:

- (i) Notify the fire department immediately;
- (ii) Take action to control the spill or discharge in a safe and approved manner;
- (iii) Remove the spilled or discharged substance, as well as any tainted tools, utensils or equipment, to an approved location for disposal; and
- (iv) To the extent possible, restore the site to its original condition.

(g) *Annual Reporting.* Each Certified Commercial Applicator shall provide an annual report to the Park Manager of (i) the product names of all pesticides they used in the City of Portland; and (ii) the approximate amount of each undiluted pesticide used in the City of Portland.

(h) *Enforcement.* The City Manager or his or her designee shall enforce this section.

(i) Any person who violates any provisions of this section or who fails to obey an order of the City Manager or his or her designee related to this section to conform to these provisions shall be in violation of City Code and subject to penalties as outlined in § 1-15. Any person in violation of this section may also be subject to revocation or suspension of their Commercial Applicator Certificate and denial of subsequent applications for their Commercial Applicator Certificate consistent with the provisions of Chapter 15.

(ii) This Section may be enforced through the Uniform Summons and Complaint process or M.R. Civ. P. Rule 80K

Portland Pesticide Ordinance

Purpose

The purpose of this chapter is to safeguard the health and welfare of the residents of and the visitors to the City of Portland and to conserve and protect the City's terrestrial and aquatic environments, including all animal and plant life.

Provisions

The following provisions shall be applicable to all retail, commercial, institutional, residential and municipal turf, landscape and pest management activities conducted outdoors within the City of Portland, on both public and private land.

(a) Permitted:

1. Organic land care practices.
2. Sale or use of organic land care products.

2.1. All control products and soil amendments, including fertilizer and compost, used under the terms of this article shall be in keeping with products that can be used on Maine Organic Farmers and Gardeners Association certified farms, and/or products permitted by the Organic Materials Review Institute or the USDA National Organic Program.

(b) Prohibited:

Sale or use of synthetic fertilizers and pesticides, other than pesticides classified by the US Environmental Protection Agency as exempt materials under 40 CFR 152.25, and those products permitted by the Organic Materials Review Institute.

Outreach and education

(a) The City:

The City shall identify or prepare, and then periodically disseminate, materials designed to educate the community about the role of pesticides in our local environment, and the restrictions imposed by this ordinance. Education may take the form of pamphlets and brochures, whether produced and distributed on paper or electronically, and classes and seminars, involving City staff, non-City governmental agencies, community and advocacy groups and other resources.

(b) Commercial Pesticide Applicators:

In addition to the state-required training and license to apply pesticides, commercial pesticide applicators shall be required to be certified in organic land care management by one of the accredited organizations that provide this training, such as the Northeast Organic Farming Association or Rutgers University. Such courses should include information on soil testing and analysis, soil health, organic pest and disease management, organic fertilizers and amendments, and water management. In addition, a course should provide a framework for

defining what is organic or sustainable, such as *NOFA Standards for Organic Land Care 5th Edition*, which allows practitioners to know whether their practices are Preferred, Allowed or Prohibited in Organic Land Care.

Definitions

The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Organic land care: An extension of the principles and practices of organic agriculture to the care of turf landscape

Pesticide: Any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest; any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant; and any nitrogen stabilizer. It does not include multicellular biological controls such as mites, nematodes, parasitic wasps, snails or other biological agents not regulated as pesticides by the US Environmental Protection Agency. Herbicides, fungicides, insecticides, rodenticides and antimicrobial pesticides are pesticides.

Pest: Any undesirable insect, plant, fungi, bacteria, virus or microorganism.

Commercial Pesticide Applicator: Any person that performs pesticide applications for property owners.

Emergency waiver

If an emergency situation warrants the use of non-exempt pesticides, the City Council may grant a seven-day temporary waiver. The least-toxic material available must be used to address the emergency. Letters to abutters detailing the treatment plan and notice to city residents in the form of an advertisement placed in the city's newspaper of record must be given 48 hours in advance of any non-exempt pesticide applications. The presence of weeds, vegetative overgrowth or common fungal diseases in the usual course of landscape management shall not constitute an emergency.

(a) Waiver determination shall be based on the following criteria:

1. The pest situation presents (a) an immediate threat to human health or environmental quality, or (b) an immediate threat of substantial property damage or loss; and
2. Viable alternatives consistent with this ordinance do not exist. The City Council shall request the Transportation, Sustainability and Energy Subcommittee to review any waiver requests made under this section, and to recommend a course of action.

Enforcement and permits

This article shall be enforced by the Code Enforcement Officer, according to the policies governing enforcement of municipal ordinances in the City of Portland.

Conflict and invalidity

If a conflict or inconsistency is found between this article and other sections of the Zoning Ordinance or City Charter, the terms of the stricter provisions shall prevail. The invalidity of a provision of this article shall not invalidate any other provision of the article.

Authority

Pursuant to 30-A M.R.S.A. § 3001, municipalities may enact ordinances to protect the welfare of their inhabitants. Pursuant to 22 M.R.S.A. § 1471-U, Maine municipalities may enact ordinances that apply to pesticide storage, distribution or use. Pursuant to 38 M.R.S.A., § 1310-U, municipalities may enact ordinances with respect to solid waste facilities with standards that are not more strict than those contained in the Maine Hazardous Waste, Septage and Solid Waste Management Act 38 M.R.S.A. §§ 1301-1319-Y, the Protection of Natural Resources Act 38 M.R.S.A. §§ 480-A-480-Z, the Site Location of Development Act 38 M.R.S.A. § 481-490, and the rules adopted under those articles, as amended from time to time.