APPENDIX A

REPORT

Council

Meeting Date: August 9, 2021

FROM: Parks and Open Space Department

DATE: July 27, 2021

SUBJECT: **Gypsy Moth Mitigation Plan, August 9, 2021**

WARD: Town-wide

RECOMMENDATION:

1. That the report "Gypsy Moth Mitigation Plan, August 9, 2021" dated July 27, 2021 from the Parks and Open Space department, be received.

2. That the implementation of LDD egg mass removal from 2,358 municipal trees in the Fall of 2021 and at an estimated cost of $165,000 to be funded from Capital reserves, be approved.

3. That staff prepare a 2022 LDD Management Program to be presented to the 2022 Budget Committee for consideration.

4. That the Town continue to liaise with Conservation Halton and Ontario Parks in an effort to include areas under their jurisdictions in future aerial spray programs or other mitigation measures.

KEY FACTS:

- Oakville, similar to many municipalities, was significantly impacted by LDD infestations (Lymantria dispar dispar) in spring 2021;

- Municipalities and provincial authorities utilized different approaches from natural control (do nothing) to aerial spray, single tree treatment, tree injection and egg mass scraping to control the population of LDD (Lymantria dispar dispar);

- Due to the highest population of LDD, recorded in the last 30 years in the province, and the significant number of residents' requests to do more to curb LDD infestation, natural control has not been supported by residents as an

acceptable approach to control LDD population in Oakville and other urbanized areas.

- Forestry Services Section completed a mitigation program that included an aerial spray for 102 ha. of forested areas, a ground spray of 162 high value oak street trees and distribution of 200 tree banding kits to the private homeowners, residing within the highest infestation areas, to control the population of LDD in 2021.

- Forestry received 476 service requests related to LDD in 2021. In 336 of those cases, the residents requested the Town to expand its LDD aerial spray program and to add more treatment options to protect oak stands and single oak trees.

- An operational challenge for the aerial spray option for all municipalities is that there is a single contractor who has been approved for the required Ministerial permits to fly over urbanized areas and perform aerial spray in the Greater Toronto and Hamilton Area.

- Enabling an accelerated single source procurement process for LDD aerial spray program greatly assisted the Town to secure this contractor in 2008, 2018, and 2021. It is recommended to utilize the single source procurement option for possible aerial spray program in 2022 given the limited option for contracted services.

- Egg mass scraping is an effective but labour intensive method of LDD population control. It is the only viable option to be implemented in the fall of 2021 and winter 2022 to decrease the population of next generation of LDD.

- Based on all service requests related to LDD infestation combined with site inspections and auditing data, it is recommended to include 2,358 street trees in LDD egg mass removal project, costing $165,000.

- According to the latest defoliation and egg mass survey, site inspections from the treated and untreated oak stands and street oak trees and site inspections in response to service requests received in 2021, there are forested areas of concern that might see another year of heavy LDD infestation in 2022.

- Forestry Section will report to Council in November 2021 and request the required resource for implementation of aerial spray on high and medium LDD egg mass density areas and highly defoliated forested areas, as well as ground spray and tree banding on high value street oak trees in 2022.

- This report is responding to a Council Request for Report on gypsy moth.

BACKGROUND:

At the June 21, 2021 Council Meeting the following Request for Report was approved.

LDD Infestations

Whereas gypsy moths are an invasive species causing significant damage to local trees and forest areas, and;
Whereas aerial spraying can be used to help control the level of gypsy moth infestations, and;
Whereas residents in areas adjacent to Town of Oakville property have requested expanded use of the aerial spraying program to areas that were excluded from spraying this year.

Therefore be it resolved that staff report on options to:

1. Improve the process for selecting areas to be included in the aerial spraying program to maximize its effectiveness.
2. Work with other public land owners such as the province and Halton Conservation to coordinate treatment of impacted land.
3. Improve communication about the Town work to manage gypsy moth infestations specifically to residents who back directly onto Town of Oakville lands impacted by gypsy moths and things residents in general can do to help manage gypsy moth infestations.
4. That staff report on any other viable options to manage gypsy moth infestations in 2021.

Oakville's urban forest is susceptible to a variety of stress-inducing pressures, including drought, disease and insect pests. LDD moth, formerly known as gypsy moth, is an invasive insect pest that has the potential of inflicting serious damage in several forest areas.

Insect Profiles

LDD moth is an exotic forest insect pest that is native to Europe and considered to be a serious defoliator of trees and shrubs. Severe defoliation can reduce tree growth and predispose trees to attack from other insect pests and diseases. All species of oak are susceptible to LDD moth. The larva of this insect also feed on poplar, birch, willow, maple, beech, and cherry, and if faced with a shortage of deciduous leaves, they will feed on conifers (hemlock, spruce and pine) and ornamental shrubs. The Canadian Food Inspection

Agency (CFIA) recognizes LDD moth as an important exotic forest pest and is regulated by the CFIA, however due to its widespread distribution, CFIA is not involved in the implementation of any control programs.

Forestry staff follow an Integrated Pest Management (IPM) approach in dealing with many forest health issues, including invasive exotic insect pests. IPM is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a manner that minimizes economic, health, and environmental risks. IPM does not attempt to eradicate a particular pest, but is targeted at keeping pest populations below the threshold level so they cannot cause significant tree damage and/or mortality.

Historical Management Approaches

In 2002, an outbreak of LDD moth in Iroquois Shoreline Woods weakened the Oak trees and resulted in oak decline and two-lined chestnut borer infestation. The resulting decline and infestation within the woodland caused devastating tree mortality. Forestry staff has been monitoring the changes in the population of LDD moth since that time. In 2005, staff observed an increase in LDD moth population, and undertook a more comprehensive monitoring program.

As the result of the 2007 surveys, Oakville participated in a collaborative spray program in 2008 with neighboring municipalities to spray 63 hectares (155 acres) of municipally infested woodlands with a biological insecticide, Bacillus thuringiensis var. kurstaki (Btk). The Forestry section also implemented an aerial spray program in 2018 targeting 110 hectares (271 acres) of infested municipal woodlands for treatment.

According to 2018 LDD survey report, there was a significant reduction in LDD populations, as a result of aerial spray program in 2018. Further observation of LDD and cankerworm activities during 2018 pest detection survey also indicate a significant reduction in defoliation and improvement of overall health of trees in 2018.

Recent (2021) Mitigation Efforts

In response to the increasing populations of LDD egg mass documented in a December 2019 Forestry consultant's survey report, as well as an increasing number of residents requests in 2020, Forestry planned and executed an aerial spray application of Btk to 110 hectares of municipal woodlands in 2021.

In an effort to coordinate aerial spray 2021 program with Conservation Halton, staff shared the scope of work and the map of 2021 aerial spray with Conservation Halton in December 2020. Conservation Halton's concern

regarding the impact of Btk spray on mottled duskywing, a species at risk, resulted in excluding 8 hectares of land, north Dundas Street from the program. Conservation Halton later secured the budget to spray 144 ha. in four areas in other Municipalities.

Forestry completed aerial spray program on 102 hectares, with the 8 hectare portion removed from the spray program due to the presence of mottled duskywing, a species at risk that may have been adversely affected by the application. Forestry also completed a ground spraying program that targeted 162 street trees in 2021, within neighbourhoods adjacent to areas that had severe defoliation in 2020.

Additionally in 2021, Forestry staff canvassed suppliers for tree banding kits, and due to COVID-19 related shortages in the supplies, were only supplied with 150 kits. All of these banding kits along with 50 tree banding kits purchased in 2018 were distributed to residents who reported a significant presence of LDD moth on municipal trees adjacent to their property.

Other Municipal and Provincial Responses

Faced with similar outbreak levels within 2021, other municipalities and provincial authorities have undertaken different approaches in response to the outbreak.

- City of Mississauga had completed aerial spray programs in 2018 for approximately 1,400 hectares of public and private properties with an approximate cost of 1.9 million. However this neighbouring municipality did not implement an aerial spray program in 2021. Their response in 2021 was limited to injecting and ground spraying of 404 street and park trees.

- City of Hamilton completed ground spraying for 188 trees in 2021.

- City of London completed an aerial spray application of Btk for 5 parks, having a total of 13.81 hectares, in 2021.

- City of Toronto conducted TreeAzin injections to 493 street trees, ground sprayed 83 trees, and conducted egg mass removals on 4,387 trees in 2021.

- City of Burlington aerial sprayed 89 hectares in 2021, utilizing funding from their cancelled 2020 aerial spray program (cancelled due to COVID-19).

- Ontario Parks released a statement that no aerial applications of Btk were being undertaken within provincial parks in 2021, and adopt a stance that aerial spraying has significant non target impacts.

- Conservation Halton aerial sprayed 144 hectares, on four different sites outside of the Town's boundaries.

COMMENT/OPTIONS:

In 2021, municipalities and provincial authorities utilized different approaches from natural control (do nothing) to aerial spray, single tree treatment, tree injection and egg mass scraping to control the highest recorded population of LDD. Hence there are a wide range of recommended action plans. Unfortunately, there have also been cases where arboricultural companies were hired by some private homeowners to spray public trees with chemical, harmful insecticides without proper authorization from municipalities.

The Forestry section applies three sets of information to outline its management options and action plans to control LDD population, including:

- Proactive monitoring: Forestry's consultant perform an extensive LDD survey every year to identify areas having high egg mass density and high defoliation rates due to LDD.

- Reactive monitoring: Forestry performs post treatment monitoring to assess the efficacy of treatment and the impact of Nuclear Polyhedrosis Virus (NPV) on LDD population.

- Service request inspection: Forestry staff inspect all LDD related service requests received by ServiceOakville to identify the best method of management control and scope of treatment.

Action plans, challenges and options:

The action plan developed by the Forestry Section to reduce the population of LDD in 2021 include:

<u>Aerial spray</u>

Aerial spray with Btk, within the proper and limited window of time, is the most effective and least harmful method of controlling LDD. Oak stands, having high egg mass density and high defoliation rate, was treated in 2021.
Challenges exist with the retention of qualified contractors to perform the aerial application service. In multiple conversations with Transport Canada, no other companies were qualified and equipped to obtain the required permits to implement an aerial spray program over urbanized areas other than Zimmer Air. As a result, a single source procurement process was utilized in 2008, 2018, and again in 2021. Given the demand on services and shortages of the

Btk in 2021, this represents a highly fragile supply chain for completion of aerial sprays in the future.

In order to ensure that the services of the Transport Canada approved contractor can be retained, it is recommended to continue utilizing single source procurement for aerial spray program in 2022

Tree Banding

Tree banding is an effective way to locally reduce the number of LDD caterpillars. They are applied approximately 5 feet up on the main stem, and catch caterpillars during their daily migration from the ground to the canopy. Tree banding is a viable option for a select number of high value trees. It is a labour intensive task to be implemented within the limited timing of implementation in spring.

Resident responses to the provision of the banding kits were very positive in both 2018 and 2021. Currently there is a shortage of tree banding kit supply. It is expected that related supply shortages will be resolved for the materials needed to further manage the LDD moth outbreak in 2022.

Forestry staff will explore the possibility with the manufacturer for a larger order to be used for a selected number of high value municipal trees as well to provide greater numbers to residents residing in the high infestation areas, in advance of the 2022 hatch out season.

Ground Spray

Ground spraying of Btk is an effective treatment option to inhibit feeding and reduce populations. It is a labour intensive approach and not recommended and/or implemented for trees in forested areas due to the limited accessibility of target trees. The other challenge is the narrow application time (2-3 week window) after the hatch out of LDD moth and the emergence of target leaf species to allow for bio-insecticide deposition on the leaves.

Forestry is continuing to monitor the development of LDD in 2021, identify new areas of defoliation from resident reports, and monitoring for signs of NPV population controls. Subsequent budget preparation for a 2022 LDD Management Program, including the exploration of the cost impacts of aerial spray, ground spray, tree banding and egg mass removals will be presented to the 2022 Budget Committee in November 2021.

Other Techniques to Manage LDD Moth:

TreeAzin Injection

TreeAzin injection controls LDD moth by inhibiting larval development and therefore decreasing the amount of foliage consumed, assisting in limiting the amount of damage to the tree. This is an available option for a select amount of high value trees, but does not represent an approach to reduce the population as a whole. Considering the higher cost of tree injection compared to other methods of single tree treatment, the short time window of operation and injection wound as a result of multiple injections this technique is not recommended for LDD until further inquiry.

Egg Mass Scraping

LDD moth lay eggs on different height of the trees from the main trunk to upper canopy. Removing egg masses is an effective but labour intensive approach that has the potential to reduce the number of LDD moth that hatch out in the springtime. While optimally all parts from the main trunk to the branches in the upper canopy should be cleared, egg mass removal from the main trunk, up to 7 meters in height could make a significant difference in reducing the next generation population with much less cost. Egg mass removals can occur from September to April to assist in reducing the defoliation impacts for the following emergent window. This technique is not effective within woodlands given the dispersal capabilities of LDD moth across a continuous canopy, but it is a recommended option for high value street trees.

Pheromone Traps

Pheromone traps are an effective method for detecting the presence of low-level LDD moth populations but less effective during periods of high population presence when the traps can become saturated with moths. Additionally, as the female LDD moth does not have a wide dispersal range, traps tend to collect only males, hence narrowly reducing egg mass deposition. Due to current supply shortages, pheromone traps have an extremely low availability, and are not a method to have a high impact to current population levels.

Natural Population Controls

Natural control is another biological control of LDD. Ultimately, the population decline will happen primarily from naturally occurring biological population controls when the population increases to such high levels, such as parasitoids, nuclear polyhedrosis virus (NPV), and the *Entomophaga maimaiga* fungus. As a prelude to a potential 2022 program, staff have recently initiated

monitoring occurrences of the NPV virus causing caterpillar mortality near the end of the caterpillar lifecycle in 2021.

Due to global spread of harmful forest pest species including LDD as a possible consequence of climate change, the increasing trend in population of LDD in recent years and the significant number of residents' request to do more to curb LDD infestation, natural control is not a viable option and has not been received as an acceptable approach to control LDD population in Oakville and other urbanized areas.

Operational Plan for Fall 2021 and Winter 2022

Municipalities conduct egg mass surveys from September to December each year to plan for appropriate treatment option for the subsequent year. A combination of reasons including the timing of the egg mass reports that Forestry receives in January of each year, the single contractor providing the service for all municipalities in Greater Toronto and Greater Hamilton areas, a complicated operational process to obtain the required Ministerial permits to perform aerial spray, make financial planning to secure the budget for aerial spray program a challenging task. In particular, receiving the egg mass survey report in January is too late to secure the budget, the resources and the contractor needed for implementation of aerial spray for the same fiscal year.

For these reasons the Forestry section has adopted three criteria including:

1. Proactive monitoring with consideration of just two months egg mass survey progress report (September and October).
2. Post treatment monitoring including monitoring NPV presence and impact on LDD.
3. Site inspections in response to service requests to plan for the 2022 LDD budget.

Forestry staff recommend presenting a LDD report to Budget Committee in November including the budget to treat similar or increasing LDD moth populations in 2022. As progress reports on egg mass surveys are received in the fall of 2021, operational adjustments will be made to account for the most up-to-date information for population forecasting. Forestry staff will attempt to enter into an agreement with the qualified contractor earlier than other organizations possibly undertaking a similar 2022 spray program. Given the anticipated high demand for the single qualified contractor in 2022, it may result in a higher per hectare pricing than seen with previous programs.

Egg mass scraping is the only viable option recommended that could be implemented in the fall of 2021. The main objective of the project would be to reduce the population of next generation of LDD moth. The operation can start

as early as September and be continued until March/April 2022. Staff geo-located all service requests related to LDD infestation combined with their inspections and auditing data and identified 2,358 street trees to be included in this project.

Contractors can reach to 7 meters height of trees and scrap them from all LDD egg masses with an extendable pole pruner equipped with a scraper without the need for an aerial truck or the need to climb trees. This has the potential to significantly reduce the cost and affect the population of next LDD generation in 2022.

Considering $10.00 as an average cost per metres length of the height for the service ($70 per tree), the operational cost of this project is calculated to be $165,000.

CONSIDERATIONS:

(A) PUBLIC

The public is aware of the importance of our urban forests and the impact of LDD moth and other invasive pests on the Town's forest health. Staff will continue communicating with public through public meetings/open houses, notices delivered to homes, advertisements in local newspapers and other print brochures, electronic communications, to educate the public and made them aware of planned LDD management options including egg mass removal, aerial spray and ground spray programs in 2021 and 2022.

(B) FINANCIAL

The total cost of LDD egg mass removal project, for 2,358 trees in 2021, is estimated at $165,000. It is recommended the program be funded from Capital Reserves. The scope of 2022 LDD aerial spray and ground spray has yet to be determined. Projecting the cost of 2022 project, at minimum, requires partial egg mass survey progress report by October, and further monitoring. This cost may also be impacted by the actions of adjacent municipalities for 2022. Initial discussions are already occurring with neighboring municipalities to gauge responses.

(C) IMPACT ON OTHER DEPARTMENTS & USERS

An egg mass removal project does not have any impact on other departments. The 2022 LDD moth management program, especially aerial spray program, would require support from several departments to effectively communicate and implement this initiative. Departments including Strategic Initiatives and

Communications, Finance, Roads and Works, Oakville Transit, Halton Regional Police, Ontario Provincial Police, Health Canada, Pest Management Regulatory Agency, and Ministry of Transportation.

Forestry has successfully implemented aerial spray in 2008, 2018 and 2021, hence all internal departments and external authorities are supportive and aware of the business process.

(D) CORPORATE STRATEGIC GOALS

This report addresses the Corporate Strategic Goals to enhance our natural environment, to be accountable, to continually improve our program and services, and to have programs that are environmentally sustainable.

(E) CLIMATE CHANGE/ACTION

The urban forest is under ongoing pressure from climate change, invasive species, pests and disease.

Global spread of harmful forest pest species including LDD is a possible consequence of climate change. A model of the LDD seasonality was used to predict the probability of its establishment in Canada (Régnière et al. 2009). The model predicted that this species, which has many host plants will threaten considerable hardwood forest resources as climate change allows it to expand further north and west into Canada.

It is estimated that the proportion of Canada's deciduous forests at risk of damage by gypsy moth will grow from the current 15 percent to more than 75 percent by 2050.

The recommendation and action plans presented in this report aims to control the increasing LDD population trend in the town of Oakville and ideally keep them under its endemic population level.

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