SLR Consulting (Canada) Ltd.
300 Town Centre Blvd., Suite 200, Markham, ON L3R 5Z6

March 27, 2026

Attention: Carlos Canejo, VP, Development
Prologis
85 The West Mall
Etobicoke, ON M9C 5L5

SLR Project No.: 243.024265.00000

Revision: 0

RE: Invasive Species Management Plan for Prologis Woodland
12519 and 12713 Humber Station Road, Town of Caledon, Ontario

1.0 Introduction

SLR was retained by Prologis to prepare an Invasive Species Management Plan (ISMP) for a part of the lands located at 12519 and 12713 Humber Station Road, Caledon, Ontario. A large industrial building and associated parking, loading, and access area have been proposed on these lands.

Prior to the proposed development, GEI Consultants Canada Ltd (GEI) prepared a Phase 1 through Phase 3 Comprehensive Environmental Impact Study and Management Plan (CEISMP), which covered the Prologis property and a larger area to the north and south along Humber Station Road. Revised CEISMPs were prepared by GEI for the Town of Caledon in July 2025 and March 2026. In November 2024, SLR Consulting (Canada) Ltd. (SLR) first prepared an Environmental Impact Study (EIS) focused on the Prologis property (Figure 1). Two revisions of the EIS were completed in August 2025 and March 2026 and submitted to the Town of Caledon based on agency comments and additional detailed design work.

Phase 2 and Phase 3 of the CEISMP (GEI March 2026) give direction regarding invasive species, specifically that:

> *The following environmental targets are being considered through this CEISMP to maintain, restore, and enhance existing conditions:*
> *• Invasive species management risk assessment to determine whether it is ecologically, socially, and economically viable to manage a given invasive species population;*
> *• Where invasive species risk assessment identifies invasive management, for a given species, carry out invasive management as per Ontario Invasive Plant Council BMPs;*
> (Phase 2, Section 9 Introduction and Phase 3 Section 2.3.2)
>
> *As part of the site-specific application for the Prologis site, the EIS should comment on the prevalence of Common Buckthorn within the woodlands, and feasibility of invasive species management.* This assessment is primarily done within this report rather than the EIS. (Phase 2, Section 9.1.5.1)
>
> *Control (sometimes referred to as asset-based protection) means strategically choosing specific locations within an invasive population where control efforts will be undertaken.* (Phase 3, Section 2.3.3)

> *Invasive Species Management Plan – for retained natural features that are heavily impacted by invasive species, an Invasive Species Management Plan should establish the extent of infestation, risk to adjacent natural features, and feasibility of management. Recommendations for management and monitoring spread of the species should also be considered.* (Phase 3, Section 2.6)

The main location within the Prologis lands where an ISMP is appropriate is the Significant Woodland (FOD8) at the north edge of the property (at left side of property on Figure 1). This woodland includes the adjacent thicket (CUT1) and interior meadow (CUM1) communities. Within this woodland, Common Buckthorn (*Rhamnus cathartica*) is very dominant. The decision to focus on this area is based on August 2022 detailed GEI mapping of invasive species within the three main natural features on the Prologis property (Appendix 1), as well as an SLR site visit to the Prologis woodland in November 27, 2024, which focused on invasive species.

The GEI mapping and the SLR site visit indicate that of the three features, and five or more invasive species recorded, that buckthorn is by far the most dominant invasive species in any one of the three locations. Most other invasive species are either not present or present in percentages of less than 10% cover. While sometimes it might be reasonable to focus on smaller amounts of invasive species (due to easier control) this is more likely to be the case where the invasive species are clustered in a small area within a site of otherwise higher quality vegetation. In our case the low percentage invasives are scattered in various places. Thus, in this case it was deemed reasonable to focus on the woodland dominated by buckthorn in order to improve the botanical diversity of this woodland and decrease (but not remove) the buckthorn cover.

This ISMP describes the woodland and then proposes measures to manage this species in this area.

Note that additionally, there is a proposed removal of a small portion of this woodland (and of adjacent non-significant wetland) to accommodate a drainage realignment along the edge of the warehouse. The proposed removal is based on the principal that i) the area of forest ELC community (FOD8) removal is small (0.06 ha); ii) the remaining removal is buckthorn thicket and iii) the proposed Natural Heritage System will lead to improved connectivity and enhanced native woodland as part of the compensation.

2.0 Description of Woodland

The Prologis Woodland (referred to as Woodland 2 in the CEISMP) is relatively small (1.5 ha) and is composed of a complex of three Ecological Land Classification (ELC) units (see clip below from SLR's EIS). It is considered a Significant Woodland due to its proximity to a wetland and a drainage feature, in accordance municipal policies.

Woodland ELC communities (FOD8, CUT1 and CUM1-1)

2.1 Vegetation

The Prologis Woodland is composed of three ELC units with conditions described as per the EIS as follows.

FOD8 - Fresh-Moist Basswood Deciduous Forest

This is a young regenerating community of Basswood (*Tilia americana*), and other deciduous trees including Green Ash (*Fraxinus pennsylvanica*) and a few Shagbark Hickory (*Carya ovata*) (Photo 1) and Bur Oak (*Quercus macrocarpa*) which together form a minority of the canopy originating often from stump resprouts. While technically fitting the ELC description of a forest, this community is dominated by a dense tall shrub layer of the non-native and invasive Common Buckthorn (*Rhamnus cathartica*) (hereafter buckthorn) which forms much of the canopy (Photo 3). The occasional Choke Cherry (*Prunus virginiana*) is also found. The buckthorn shrub layer has an approximately 90 percent coverage in both this unit and the thicket unit (noted below). There are common 'weedy' and native species within the ground cover, but it too is dominated by buckthorn saplings and seedlings (Photo 2).

CUT1 -Buckthorn Cultural Thicket

This thicket is a variably open to dense community of Common Buckthorn, with the occasional presence of young Green Ash (*Fraxinus pennsylvanica*) and Basswood. Much of the ground layer is composed of Buckthorn seedlings but old field meadow grasses and forbs are also present.

CUM1-1 Dry-Moist Old Field Meadow

The old field meadow is a very small patch of relatively diverse community of native species and exotics consisting of herbaceous plants and grasses.

Photo 1: Shagbark Hickory

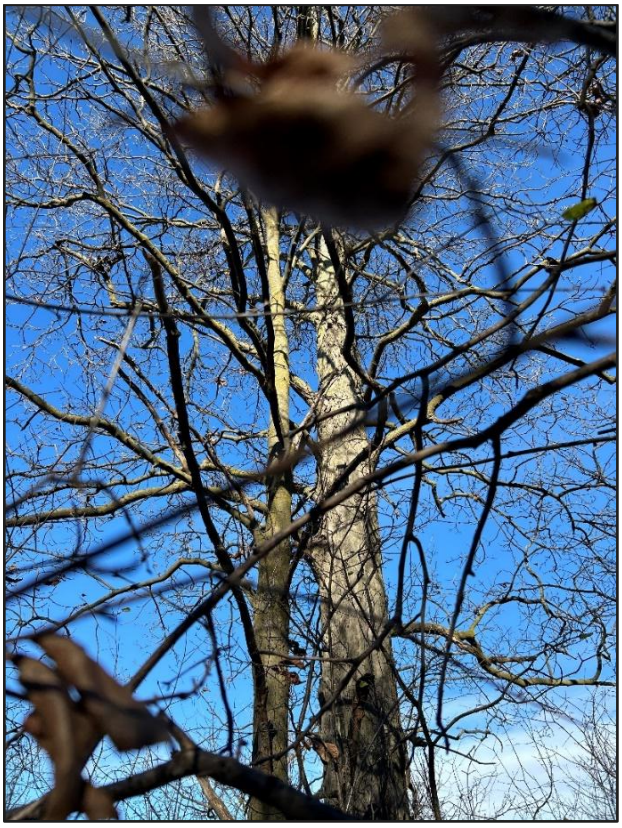

Photo 2: Buckthorn seedlings covering the ground layer

Photo 3: Typical cover in both the forest (FOD) and thicket (CUT) layers; buckthorn shrub layer is dominant.

2.2 Wildlife

The small number of common bird species which were observed in the woodland are mainly shrubland species (e.g. Gray Catbird (*Dumetella carolinensis*), Song Sparrow (*Melospiza melodia*), American Goldfinch (*Spinus tristis*)) or species of scattered treed communities (e.g. Northern Flicker (*Colaptes auratus*), European Starling (*Sturnus vulgaris*), American Robin (*Turdus migratorius*) and Warbling Vireo (*Vireo gilvus*)). One Eastern Wood-Pewee was observed in late May 2023 – it is possible that it was not a breeding species as it was not heard later in the nesting season. Eastern Wood-Pewee is listed as Special Concern provincially; however, it is still a very common species of woodlands of many types and sizes in southern Ontario. It was the only forest bird species observed in this woodland indicating how poorly developed the forest wildlife community is.

No amphibians breed in the woodland nor adjacent wetland, and there were no observations of reptiles.

3.0 Buckthorn Management Actions

The only dominant invasive species in the Prologis Woodland is Common Buckthorn. Non-native honeysuckle (likely *Lonicera tatarica*) is also present in small amounts (see GEI data) and can be dealt with through the measures proposed below for buckthorn. As noted above, buckthorn is very dominant in the mid-layer of the forest and in the ground layer. It covers about 90% of the shrub level layer in the woodland and the buckthorn are about 3 to 5 m in height. In much of the woodland, it comprises the canopy layer. Additionally, at ground level buckthorn seedlings are present in very high numbers (thousands). To improve the quality of the woodland and thicket some management actions are proposed. One set of actions is for the proponent to execute over two years, and the other set of actions are recommendations for the Town.

The CEISMP (Phase 3 Section 2.3.3.) speaks to five general levels of invasive species control, that could be used at a given site: eradicate, eradicate/contain, contain, control and follow-up. The approach chosen by SLR, based on the existing set of circumstances is control. Based on project experience and available literature, it is considered unfeasible to eradicate this population of buckthorn as this would mean an almost indefinite program and removal of most of the existing woodland. Additionally, as GEI have noted in Section 2.3.3. of the CEISMP, eradication aims to '*target invasive species having smaller, more localized populations'*; which is not the case here. Furthermore, '*High priority areas for invasive species treatment are where the greatest potential exists to eradicate the invasive species, protect Species at risk that are of highest concern and manage invasive species that require the least amount of labour investment'*. None of these conditions are present in this situation (i.e. low potential to eradicate the species, no high concern SAR, and a great deal of labour would be required for very limited results), thus indicating that the area is not a high priority for invasive species eradication.

Thus, the proposal is to instead partially remove buckthorn in nodes within which native tree species would be planted. This would then continue to be managed for buckthorn presence until such time as the native species are growing well and would be thought to survive buckthorn competition. These nodes would improve the quality of the woodland and could in time spread once the new trees overtop the buckthorn and produce seed.

Buckthorn spreads primarily through seed (i.e. berry/ fruit) dispersal via birds and mammals. If this species was dispersed via wind or root suckers primarily, then a barrier of dense trees between the existing woodland (source) and the new compensation woodland to the east (potential area of spread) might additionally be useful, however SLR determined that this would make minimal difference given that this species is often spread through flying birds.

3.1 Recommended Technical Resources

The following documents were used for direction regarding removal methods of buckthorn:

- **Common Buckthorn** (*Rhamnus cathartica*) - **Best Management Practices Technical Document for Land Managers**, June 2024, Invasive Species Centre and Ontario Invasive Plant Council. (Appendix 2)
- **Invasive Common Buckthorn** (*Rhamnus cathartica*) - **Best Management Practices in Ontario**, 2012, currently unavailable online as being updated (however SLR has a copy), Invasive Species Centre and Ontario Invasive Plant Council.

The number of nodes and restoration species prescribed are based on professional experience.

3.2 Proponent Actions

The proponent (Prologis) will undertake actions over two years. These are listed in the points below.

First Year

Buckthorn Removal – Create five 10 m-diameter nodes within the woodland (Figure 2) by removing all buckthorn through:

- Cutting of all larger individuals to stumps;
- Applying glyphosate or triclopyr onto the stumps and young seedlings at a herbicide-specific time after cutting (likely May through October) by a licensed herbicide applicator; and
- Not placing cut material into the compost or landfill; solarize first.

The location of the nodes should be disbursed across the woodland (not clustered) and placed where there are no native trees present. The location of the nodes is not proposed in the thicket community because most of this community would be removed through the channel realignment process.

Planting of Native Plants – Within each node plant five individual native trees:

- As soon after spraying as feasible given herbicide breakdown, but within the planting periods of spring and fall;
- Using native tree species that have been chosen because of their: existing presence in the woodland, fast growth, and/or widespread nature in southern Ontario (i.e. are likely tolerant of a variety of conditions);
- Using, species list:
  - White Pine (*Pinus strobus*)
  - Trembling Aspen (*Populus tremuloides*)

  - Balsam Poplar (*Populus balsamifera*)
  - Shagbark Hickory (*Carya ovata*)
  - Bur Oak (*Quercus macrocarpa*)
  - Basswood (*Tilia americana*)
  - Sugar Maple (*Acer saccharum*)
  - Black Cherry (*Prunus serotina*);
- Using a variety of stock size to ensure greater survival and ability to tolerate buckthorn competition but considering access. I.e. Could use some bareroot (smallest, easy to transport, inexpensive, most often used in restoration), some container-grown (relatively easy to move, but can become root-bound before planting), and some balled and burlap (larger trees that will have a better chance against buckthorn, but which are harder to move especially within an existing forest) ;
- With at least two different species per node, and at least five (more is better) species in total (throughout the five nodes); this is so that there is a higher chance that some species will be successful. Note that this is purposely more dense than standard and allows for some mortality and determination of which species are more successful; and
- With appropriate preparation (mulch, additional soils), and regular tending (buckthorn and other weed removal) within the 1 m diameter circle around the planted individual.

Second Year

During the year after planting, the planted individuals should be monitoring and tended by:

- Replacement of dead planted individuals where up to three surviving individuals is considered successful, thus if three to five trees are present no replacement planting need occur; if only one or two are present then replanting stock does not need to be the same species, but should be from the above list or approved locally native species; and
- Management of any buckthorn by,
  - Respraying with herbicide (if can be done without damage to new trees) **OR** mowing at an appropriate distance from the newly planted trees within the nodes; and
  - Mowing or pulling of small seedlings and saplings (up to 1 m tall) within the 1 m diameter circle around the newly planted trees, if it is considered that the soil disturbance it will not harm the newly planted tree).

Mowing (or strimming in this case) may be the best option for control of young buckthorn growth within the nodes for the years after planting. The 2012 Invasive Species Centre and Ontario Invasive Plant Council document cited below states that '*mowing will reduce stem numbers and vigour, and will eventually kill off most seedlings. It needs to be carried out in early **AND** late summer for at least **2 – 3 consecutive years** and is recommended for stems that are less than 2 years old. Mowing will also prevent growth of native vegetation so should only be used in areas with dense buckthorn seedlings where restoration will occur*.'

3.3 Recommendations for Town of Caledon

After two years of management by the proponent, it is understood that management of the woodland will be conveyed to the Town of Caledon. During this time, the following are recommendations:

- Manage the buckthorn within the nodes for at least one more year, preferably more.
- Consider replacement of planted specimens that have not survived.
- Consider applying other measures that may be useful to enable newly planted individuals to survive to a point that they will outcompete the surrounding buckthorn.
- Consider removing additional larger individual buckthorn that are not within nodes
- Consider adding new nodes with similar methods of buckthorn removal and native species planting

3.4 Additional Actions Regarding Buckthorn

There is an existing hedgerow on the adjacent property that is abutting the north side of the woodland compensation area, and which runs southwest from the Clarkway Tributary. This hedgerow is thought to contain buckthorn which would be an additional source of fruit and seeds, contributing to the species spread. Since the hedgerow is not on the Prologis property, it cannot be directly controlled. Thus, should discussions occur with this landowner, ideally this hedgerow would be removed as soon as possible, from an invasive species management perspective.

If any machinery is used to remove buckthorn from the thicket and woodland portions of the existing woodland, these machines should not be used in the general area of new woodland area, without first a thorough wash before moving. This is to remove any berries that might otherwise be moved onto the new woodland area.

4.0 Statement of Limitations

This report has been prepared by SLR Consulting (Canada) Ltd. (SLR) for Prologis (Client) in accordance with the scope of work and all other terms and conditions of the agreement between such parties. SLR acknowledges and agrees that the Client may provide this report to government agencies, interest holders, and/or Indigenous communities as part of project planning or regulatory approval processes. Copying or distribution of this report, in whole or in part, for any other purpose other than as aforementioned is not permitted without the prior written consent of SLR.

Any findings, conclusions, recommendations, or designs provided in this report are based on conditions and criteria that existed at the time work was completed and the assumptions and qualifications set forth herein. SLR may have used AI in the preparation of this document.

This report may contain data or information provided by third party sources on which SLR is entitled to rely without verification and SLR does not warranty the accuracy of any such data or information.

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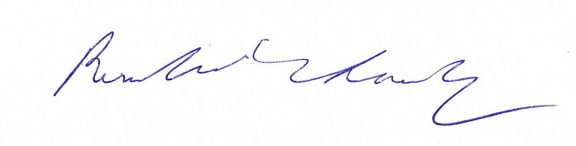
5.0 Closure

Regards,

SLR Consulting (Canada) Ltd.



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Attachments Figures 1: Site Location

2: First Year Management

Appendix 1: GEI Mapping of Invasive Species on Prologis Property

Appendix 2: Common Buckthorn (*Rhamnus cathartica*) - Best Management Practices Technical Document for Land Managers, June 2024, Invasive Species Centre and Ontario Invasive Plant Council

copy James Richardson, Mainline Planning

Figures

Invasive Species Management Plan for Prologis Woodland

12519 and 12713 Humber Station Road, Town of Caledon, Ontario

Prologis

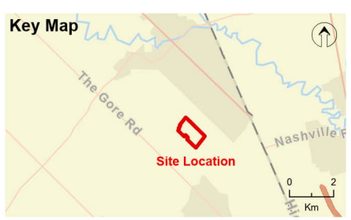
SLR Project No.: 243.024265.00000

March 27, 2026

LEGEND

- Watercourse [1]
- Waterbody [1]
- Subject Property

1 - Geospatial Ontario



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METRE SCALE

North American Datum 1983
Universal Transverse Mercator Projection Zone 17

Scale: 1:8,000
Page Size: Tabloid (11 x 17 inches)

Drawn: RS
Checked: HB
Date: Jul 24, 2025

NORTH

Source Notes: Imagery (2024) provided by ESRI Map Services. Contains information licensed under the Open Government License – Ontario.

CLIENT
Prologis

PROJECT
12519 and 12713 Humber Station Road

TITLE
Site Location

SLR

REF. NO. 2008102-1-2

Figure 1

Document Path: G:_Projects\243\243_024265_HumberStnRd\1_Workspace\1_Maps\202507_EISFigures_xx\202507_EISFigures_xx.aprx

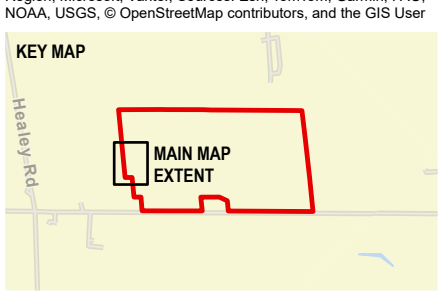
LEGEND:

- MID TO LARGE SIZE PLANTED NATIVE TREE
- BUCKTHORN REMOVAL/RESTORATION NODE
- PROPOSED CHANNEL REALIGNMENT AND ASSOCIATED WETLANDS
- DRIPLINE [1]
- EXISTING ENVIRONMENTAL CONDITIONS (ELC)
- SIGNFICANT WOODLAND REMOVAL AREA (0.41 HA)
- SUBJECT PROPERTY

ELC DESCRIPTIONS

AG – Active agricultural
CUM1-1 – Dry-Moist Old Field Meadow
CUT1 – Mineral Cultural Thicket (Buckthorn)
FOD8 – Fresh-Moist Deciduous Forest (Basswood)
MAS2-1 – Cattail Mineral Shallow Marsh
MAM2-2 – Reed -canary Grass Mineral Meadow Marsh

Notes:
1- Staked on October 19, 2021 by Toronto Region Conservation Authority (TRCA) and GEI Consultants.



0 10 20 30 40 50 m

SCALE 1:850
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 17N

THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY AND SHOULD NOT BE USED FOR NAVIGATION

PROLOGIS
TORONTO, ON

INVASIVE SPECIES MANAGEMENT PLAN FOR PROLOGIS WOODLAND

FIRST YEAR MANAGEMENT

SLR

FIGURE NO: **2**

DATE: March 27, 2026

PROJECT NO: 243.V24265.00000

Appendix 1 GEI Mapping of Invasive Species on Prologis Property

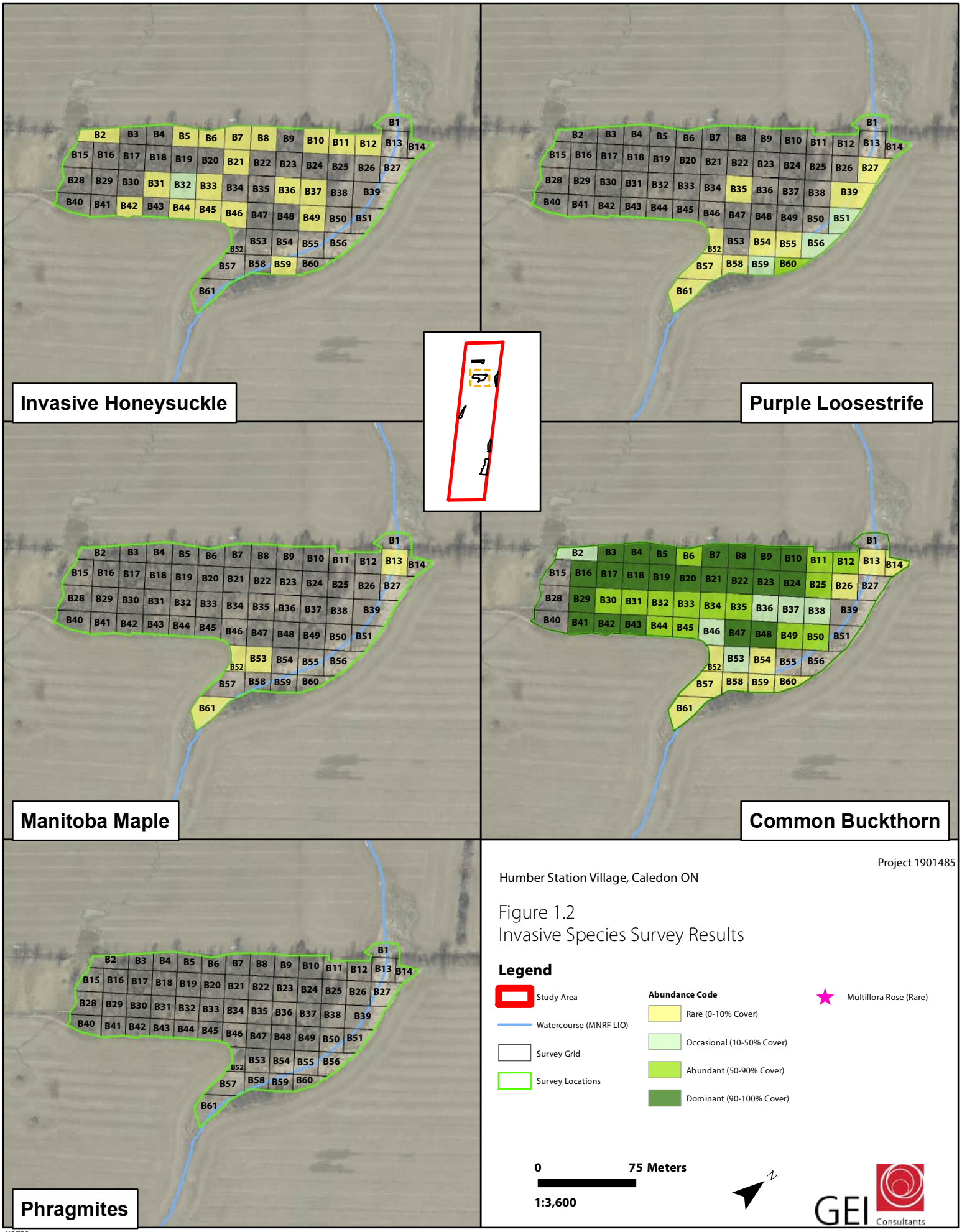
Invasive Species Management Plan for Prologis Woodland

12519 and 12713 Humber Station Road, Town of Caledon, Ontario

Prologis

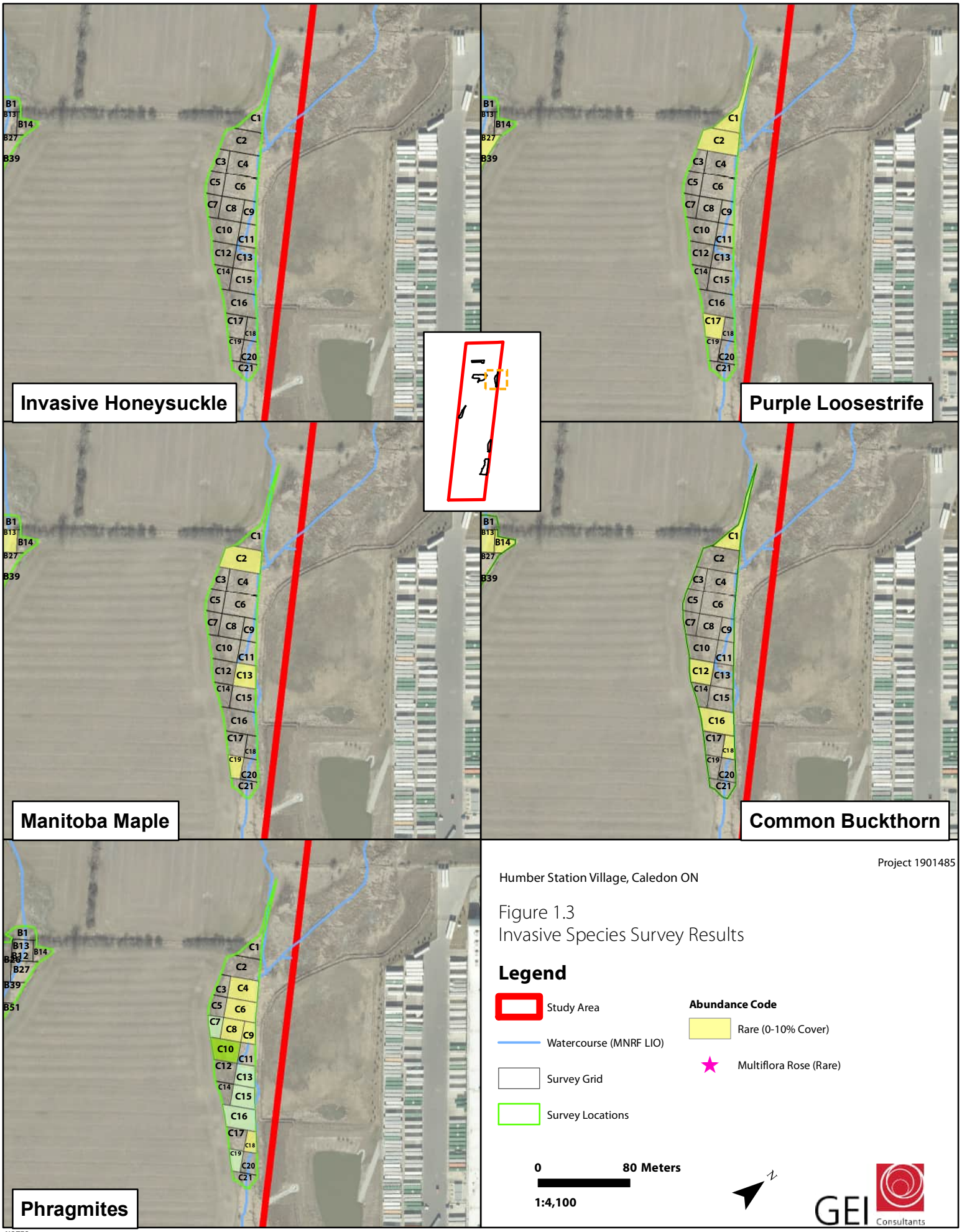
SLR Project No.: 243.024265.00000

March 27, 2026



NOTES:

1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2022.
3. Orthoimagery © First Base Solutions, 2022. Imagery taken in 2021.



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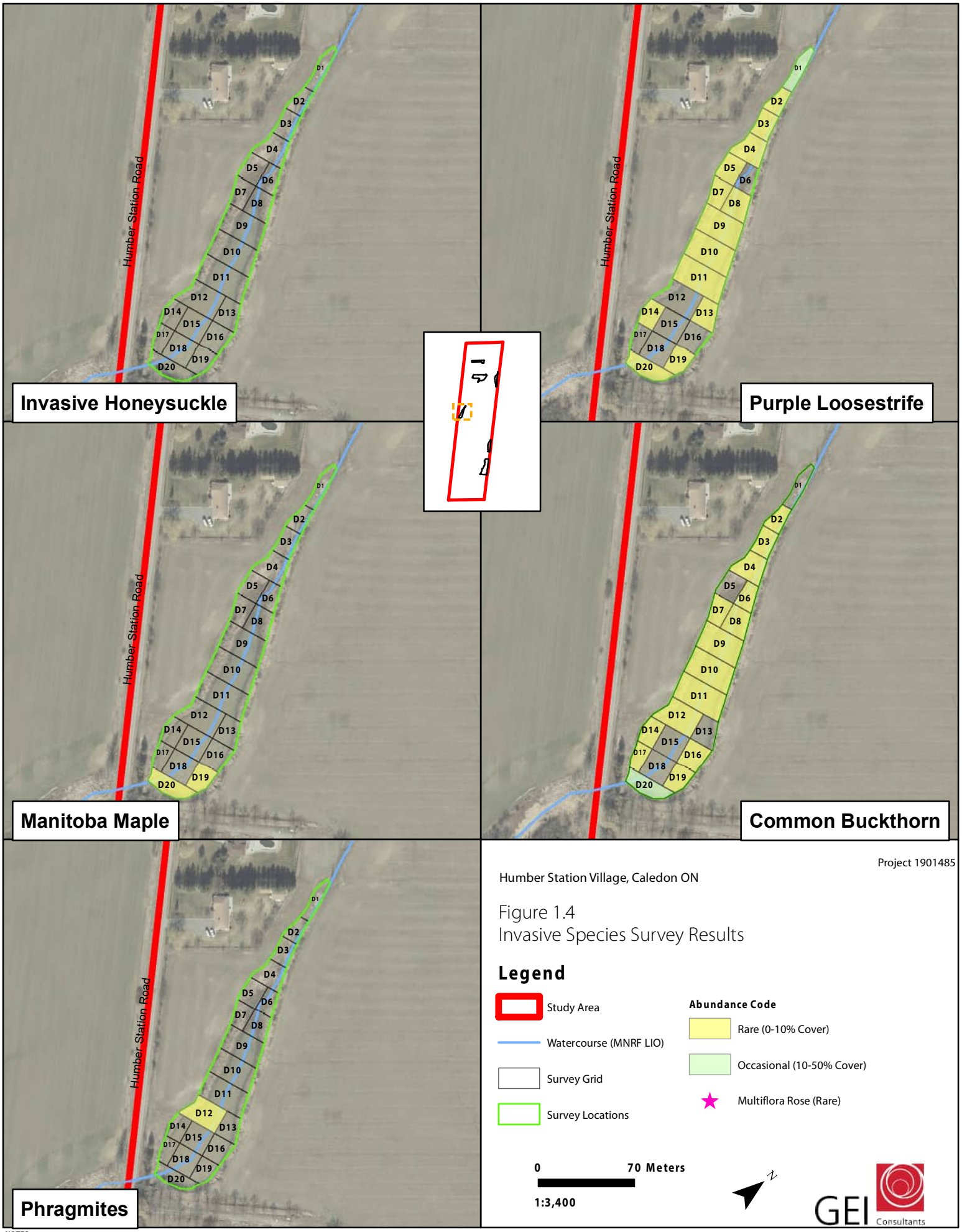

Project 1901485

Humber Station Village, Caledon ON

Figure 1.4
Invasive Species Survey Results

Legend

- Study Area
- Watercourse (MNRF LIO)
- Survey Grid
- Survey Locations

Abundance Code

- Rare (0-10% Cover)
- Occasional (10-50% Cover)
- Multiflora Rose (Rare)

0 70 Meters

1:3,400

GEI Consultants

NOTES:

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2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2022.
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Appendix 2 Common Buckthorn (*Rhamnus cathartica*)

Invasive Species Management Plan for Prologis Woodland

12519 and 12713 Humber Station Road, Town of Caledon, Ontario

Prologis

SLR Project No.: 243.024265.00000

March 27, 2026

Common Buckthorn

(Rhamnus cathartica)

Photo Credit: Valley Conservation

Best Management Practices Technical Document for Land Managers

June 2024

- DISCLAIMER -

This document conveys information recommended by leading professionals across Ontario. It contains the most up-to-date information available at the time of publication. It is not intended to provide legal advice. It is subject to change as new information emerges, tools and techniques evolve or as legislation or permitting requirements change. Tailor the timing of control to your region.

The prevention and early detection of common buckthorn is essential for an effective plant management strategy. Use this document after you have assessed your site(s) to help identify appropriate control options. An Integrated Pest Management approach is strongly encouraged, which involves using a combination of control tactics (e.g., herbicide application, cutting, and prescribed burns). For more information on the biology and life cycle of this invasive plant, please refer to the Ontario Invasive Plant Council's Best Management Practices document. Common buckthorn is listed as a Noxious Weed under the *Weed Control Act.*

Strategy and Cautions

- Remove the outlying populations (isolated plants or satellite populations) and the most prolific seed producers (female plants) first to prevent further spread.
- Small populations (≤300 m^2) of small plants (≤5 cm in diameter) can be removed manually.
- Large populations of seedlings or young trees for which pulling is not practical can be treated with a foliar application of a systemic herbicide.
- Large trees (>5 cm in diameter) should be cut at the base and stump-treated with a systemic herbicide. Alternatively, the standing stems can be sprayed with a systemic herbicide (basal bark application). These stems can either be left standing or cut down once dead.

Caution: Because of the thorns, it is recommended that protective clothing, including gloves and safety glasses, be worn when conducting manual control. Re-sprouting can be considerable after a failed control attempt. Cutting and not applying systemic herbicides leads to increased work due to multi-stem regrowth. Make sure that boots, clothing, and all equipment is cleaned at the site to ensure seeds or root fragments are not transported from the site. See the Ontario Invasive Plant Council's Clean Equipment Protocol for more details.

Management of Small Populations (≤300 m^2) and Saplings(<5 cm Diameter)

Small populations of small plants (up to 1 m tall) can be hand-pulled any time of the year. Small populations of plants 1- 5 cm in diameter can be removed using a weed pulling tool. Plants under 1 cm can be hand pulled without the use of a tool. However, gloves are recommended. Remove as much of the root mass as possible to prevent re-sprouting. Disturbed soil will result from these techniques and should be tamped down or covered in a thick layer of mulch to reduce new buckthorn seedling germination. Manual control is easiest after rain when the soil is soft and pliable. If possible, cut off branches with berries in the summer, before the berries ripen and fall off. Then come back in the fall and pull out the cut stems. Common buckthorn leaves remain green longer than most native plants, which makes identification easier into the late fall, allowing for manual control until the ground freezes . This reduces disturbance to surrounding plants that have gone dormant.

Photo: Credit Valley Conservation

Management of Large Populations (>300 m²) and Large Trees (>5 cm Diameter)

When manual control is no longer an option, chemical control is the most effective method for managing large populations. Foliar application of a systemic herbicide is recommended for leaves of small trees. Large trees (>5cm) can be cut and the stumps treated with a systemic herbicide. Alternatively, the standing stems can be sprayed with a systemic herbicide (basal bark application). These stems can either be left standing or cut down once dead. Systemic herbicides must be translocated to the roots to be effective. Some herbicides must be applied during the growing season, therefore read the labels to determine appropriate application times. Herbicide drift may prohibit pesticide use near water. At the time of publication, a bioherbicide is available for the control of common buckthorn and is an alternate treatment option for large populations and large trees. It is effective at inhibiting the resprouting and regrowth from cut stumps. This product must be applied to the plant when it is fully leafed out and must be applied to the cambium layer (inner bark) of freshly cut stumps and girdled trees because it does not translocate through the bark. Plant death occurs over three years.

Legislation and Permitting Requirements for Common Buckthorn Management

Depending on the location, timing of work, and the type of management activity proposed, permits, approvals or authorizations may be required from municipal, provincial or federal agencies before control can be initiated. Land/vegetation managers are responsible for ensuring any permits are obtained prior to proceeding. Also, if protected species or habitats are present, an assessment of the control project's potential effects and authorization could be required. Depending on the species and its location, applications should be directed to the appropriate authorities.

The management of pesticides is a joint responsibility of the federal and provincial governments. The federal government's *Pest Management Regulatory Agency (PMRA)* is responsible for approving the registration of pesticides across Canada under the *Pest Control Products Act*. **The PCPA requires the user to ensure Canadian registered pest control products are being used according to the most up to date label requirements.** Ontario regulates the sale, use, storage, transportation and disposal of pesticides including issuing licenses and permits under the *Pesticides Act* and Ontario Regulation 63/09. Federally registered pesticide products are assigned one of four product class designations (i.e., Manufacturing, Restricted, Commercial or Domestic). The pesticide class determines who can sell or use the product and the restrictions placed on its use (e.g., requires a license and/or permit). All invasive plant control programs require licensed exterminators to apply pesticides.

The use of pesticides on land is subject to the Ontario Cosmetic Pesticides Ban. Unless they are certain biopesticides and low-risk products on Ontario's "Allowable List", pesticides can only be used if they are permitted under an exception to the ban. Depending on the specifics of the extermination, invasive plant control "may" be permitted in accordance with exceptions for forestry, agriculture, public health and safety and natural resource. See Table 1 for more details. Ontario Regulation 63/09 specifies requirements for pesticide use under each exception and may include conditions such as a letter from the relevant Ministry (MNR or MECP) and/or others. A licensed exterminator can provide guidance applicable to extermination requirements. **For information on obtaining a license or a permit refer to the Ministry of the Environment, Conservation and Parks website at** www.ontario.ca/page/pesticide-licences-and-permits.

Table 1: Exceptions to the Ontario Cosmetic Pesticides Ban which may be applicable for control of common buckthorn in terrestrial environments.

Forestry	This plant aggressively invades hardwood (deciduous) and softwood (coniferous) forests and its allelopathic properties prevent native plants from growing. This exception applies to treed areas greater than 1 hectare.
Agricultural	This plant can host agricultural pests such as oat rust, crown fungus, alfalfa mosaic virus and the soybean aphid. It is also listed as a Noxious Weed under the *Weed Control Act.*
Natural resource:	This plant outcompetes native species, alters soil conditions and prevents regeneration of native tree species.

For more information on these exceptions and applicable procedures, please refer to the Ontario Invasive Plant Council's Best Management Practices document for this species.


Photo: Credit Valley Conservation

Herbicide Selection and Application

Pesticide applications can be an effective method for common buckthorn management when used as part of an integrated pest management program and in consideration of common buckthorn biology and site-specific information. Pesticides must be applied in accordance with the federal *Pest Control Products Act*, *Ontario's Pesticides Act*, Ontario Regulation 63/09 and all label directions. Most invasive species control programs using a pesticide will require an appropriately licensed exterminator. The availability of pesticides to control common buckthorn may change over time, as may the label directions on how to use the pesticide so that it does not endanger human health or the environment.

Before using any pesticide, ensure you have the most current label. Pesticide labels can be accessed using the PMRA's label search tool, which can be found by searching "PMRA label search" in any internet search engine. Always read and follow all directions on the label. The label is a legal document that must be followed exactly, including any applicable buffer zones. Using a pesticide to treat a species not listed on the label, or in a manner other than that specified on the label violates the *Pest Control Products Act* and may incur penalties.

Professionals consulted at the time this document was written recommend using glyphosate-based or triclopyr-based herbicides when their use is approved by the pest control product label. A herbicide needs to be applied annually until all remaining buckthorn plants are gone, the seedbank is exhausted and/or other vegetation is sufficiently established.

Table 2: Chemical control techniques recommended by experts for common buckthorn at the time this document was written.

Chemical Control Method	Chemical	Timing and Application
Foliar	Glyphosate	Spring and summer. Must have growing leaves present to be effective. For large populations of seedlings and saplings (<0.5 cm diameter).
Cut Stump	Glyphosate	Spring, summer or fall. Apply immediately following cut. Follow herbicide label instructions regarding temperatures at which the herbicide can be applied. Do not apply herbicides during times of heavy sap flow (early spring).
	Triclopyr	All year. Follow herbicide label instructions regarding temperatures at which the herbicide may be applied. Can be applied to stumps days to weeks after cutting.
Basal Bark	Triclopyr	All year. Follow herbicide label instructions regarding temperatures at which the herbicide may be applied. Apply chemical all the way around the stem in a 30 cm high strip. On small stems (<8 cm), the chemical can be applied to one side.

Please read the most up-to-date label in full before use. Some of the product labels belonging to these active ingredients may not be currently approved for the referenced use and/or may not be approved moving forward if label is amended.

Bioherbicide for the Control of Common Buckthorn

Bioherbicides are weed-control products whose active agent is a microorganism that exhibits growth-suppressive traits towards invasive plants. In Canada, one bioherbicide option is approved for the control of common buckthorn. The active ingredient in this bioherbicide is *Chondrostereum purpureum*, a naturally occurring fungal pathogen. This organism releases an enzyme that causes silver leaf disease. This bioherbicide is effective at inhibiting the resprouting and regrowth from cut stumps. This product does not translocate, must be applied when the plant is fully leafed out and must be applied to the cambium layer (inner bark) of freshly cut stumps or girdled trees. It is not approved for use near water and can impact certain species of nearby non-target tree species if they have open wounds. Use the PRMA label search tool to find the most updated product label. This product takes three years following the initial application to become fully effective.

Photo: Credit Valley Conservation

Common Buckthorn Treatment Times

	J	F	M	A	M	J	J	A	S	O	N	D
Hand Pulling or Digging	J	F	M	A	M	J	J	A	S	O	N	D
Chemical (Foliar)	J	F	M	A	M	J	J	A	S	O	N	D
Chemical (Cut Stump)	J	F	M	A	M	J	J	A	S	O	N	D
Chemical (Basal Bark)	J	F	M	A	M	J	J	A	S	O	N	D
Bioherbicide (Cut Stump or Bark Removal down to the cambium layer)	J	F	M	A	M	J	J	A	S	O	N	D

No Treatment

Optimal Treatment Times

Suboptimal Treatment Times

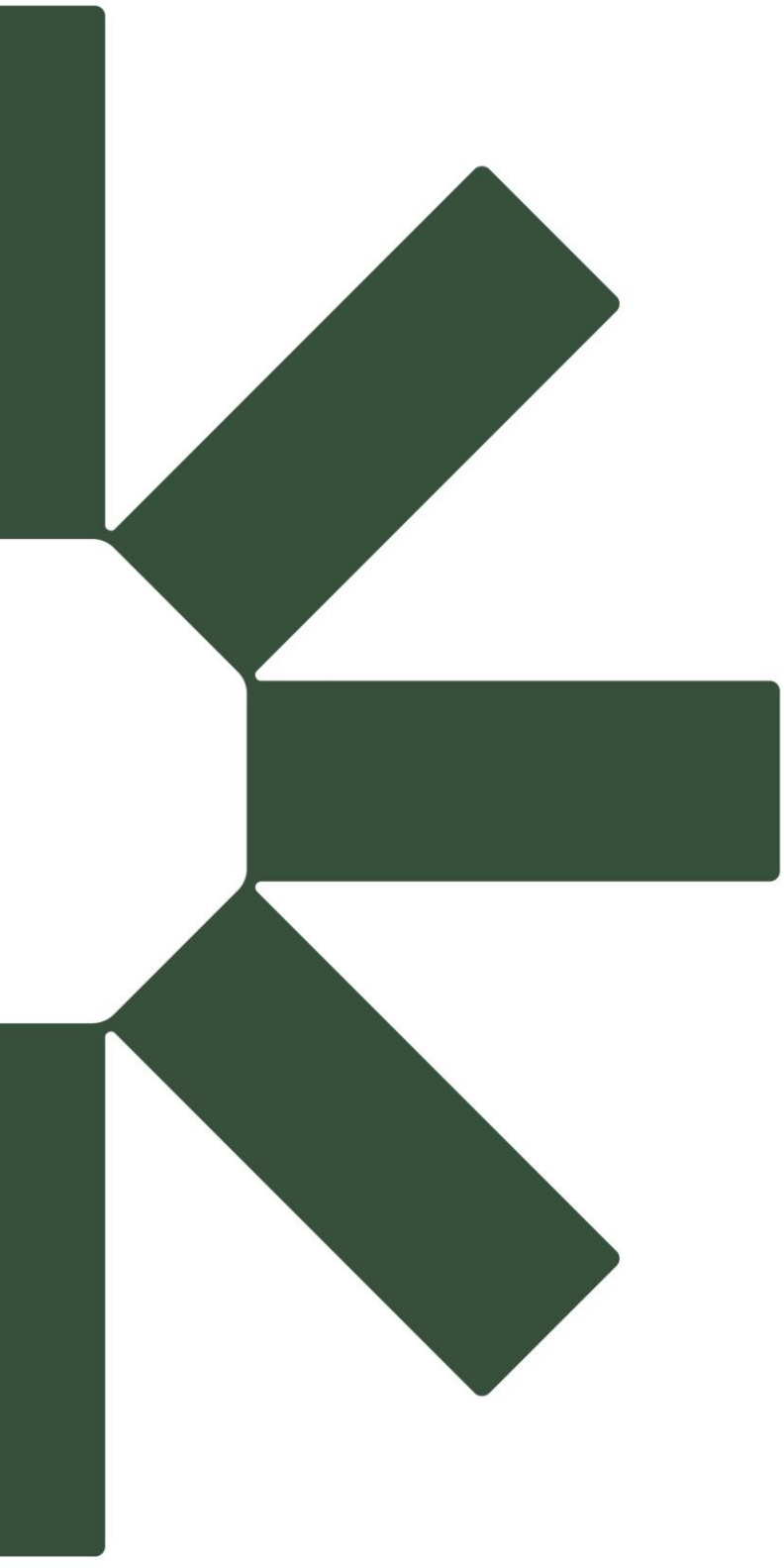
***Note: The above treatment times for herbicide application must consider weather conditions, location, and the plant growth stage.**

Disposal

Do not compost viable plant material (fruits, seeds and roots) at home or send to landfill. Viable plant material must be solarized before disposal by placing it in sealed black plastic bags and leaving them in direct sunlight for 1 – 3 weeks. Plant material can be sent to large-scale municipal composting facilities where the compost pile reaches temperatures high enough to kill living plant material. Ontario composting facilities are required to routinely monitor the compost process and meet strict, provincially regulated time-temperature parameters for pathogen kill. Consult your local municipality to determine if this is an appropriate course of action. When seedlings or young shrubs are pulled, they should be disposed of in a manner that will ensure that their roots will dry out completely. When feasible, it is advised to remove limbs containing dense clusters of berries. The remaining biomass can be sent to municipal composting facilities while the seed-containing berries are best disposed of after solarization at the landfill. Alternatively, dried branches and stems (without fruits) can be safely incinerated, for example in burn barrels or fire pits, where local bylaws permit. Buckthorn makes excellent firewood. Common buckthorn can also be disposed of through chipping. It is important to ensure all fruit has been removed or you are only doing so with male trees.

Rehabilitation and Monitoring

Control is much more successful when heavily infested areas, often with seed-saturated soil seedbanks, are re-planted with native trees, shrubs, and plant species that can compete with new buckthorn growth. See the Ontario Invasive Plant Council's Best Management Practices document for more details. Follow-up monitoring and removal of new growth is crucial for successful control. Common buckthorn seeds can remain viable in the soil for up to 5 years.



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