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Submittal

Project #: L032-0002

Project: Replacement of Folly Lane Bridge over Skungamaug River, Bridge #04632

Location: Coventry, CT

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Submittal #: 018-Invasive Vegetation Control Plan-New

Subcontractor: All Habitat Services

Attached: Control & Removal of Invasive Vegetation Plan

This submittal has been reviewed for compliance
with the Contract Documents and approved by:

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Invasive Species Management Plan
Folly Lane Bridge Replacement Project
Town of Coventry, Connecticut

August 11, 2020

Prepared For:
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1. Company Background

All Habitat Services, LLC is a recognized provider of ecological management services. With a primary emphasis on wildlife habitat enhancement and conservation their diverse work settings encompass aquatic, emergent and terrestrial sites. All Habitat's professional staff of biologists, restoration specialists and ecological technicians are committed to the use of best management practices. Drawing from wide-ranging backgrounds and specializations in insect, plant and wildlife biology provides them with the ability to develop innovative, practical, integrated management solutions using cultural, mechanical, chemical and natural techniques. This dedication to holistic methods is the foundation to executing creative projects that deliver highly beneficial outcomes for the host habitat while minimizing disruption to its dependent wildlife. All Habitat's OSHA 10 certified commercial herbicide applicators licensed by the state of Connecticut Department of Energy and Environmental Protection will conduct all herbicide applications. Our extensive customer base includes numerous conservation organizations, state and federal government agencies, municipalities and private landowners. The success of our work has earned us an excellent reputation for producing quality results. We are well qualified to execute an ecologically appropriate invasive plant management program for this site.

2. Invasive Species Management Plan

The Management plan consists of managing certain targeted invasive plant species as listed on the Connecticut Invasive Plants Council's "Connecticut Invasive Plant List - October 2018" and US Army Corps of Engineers (ACOE) New England District Compensatory Mitigation Guidance Appendix K when identified within the specific treatment area. The ACOE invasive species control success standard requires the following species to be controlled at this site: cattails (*Typha spp.*), common reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*), reed canary grass (*Phalaris arundinacea*), Japanese knotweed (*Fallopia japonica*), multiflora rose (*Rosa multiflora*), Russian and autumn olives (*Elaeagnus angustifolia* and *Elaeagnus umbellata*), and smooth and common buckhorns (*Frangula alnus* and *Rhamnus cathartica*).

2.1 Invasive Species Management

The primary targets at the site are invasive shrubs, trees and herbaceous species standing alone or intermixed within the native mosaic. Species that pose the greatest risk include purple loosestrife (*Lythrum salicaria*), reed canary grass (*Phalaris arundinacea*), Japanese barberry (*Berberis thunbergii*), Japanese knotweed (*Fallopia japonica*), multiflora rose (*Rosa multiflora*), Russian and autumn olives (*Elaeagnus angustifolia* and *Elaeagnus umbellata*), and smooth and common buckhorns (*Frangula alnus* and *Rhamnus cathartica*). These and other invasive species can be addressed with multiple techniques depending on the growth form and setting.



The phenological differences of the targeted invasive species provide windows of opportunity to maximize control measures while creating favorable conditions for promoting protection of native species and opportunities for native release and revegetation. Their characteristic early expression in advance of native species growth allows a sequencing of control activities that limits potential for non-target injury. Early season intervention also suppresses fruit and seed production, limits biomass and provides release for competitive native species. The following customized restoration prescriptions have been selected from the suite of available tools and management techniques, which should be applied in the most effective ways to ensure a successful invasive species management program for these targeted species. All herbicide applications will be conducted by certified Junior Operators under the supervision of a Commercial Supervisor, all licensed by the Connecticut Department of Energy and Environmental Protection.

In most cases, herbicide applications should be conducted prior to any cutting or disturbance. Exceptions would be in areas where foliar applications are impractical due to the height of the plants being too great and where the spray drift cannot be adequately controlled or when best management practices suggest cutting first. Basal bark herbicide application is the preferred technique for trees, tree shrubs and large caliper multi-stem shrubs and vines. Spot foliar herbicide applications that are selectively applied to the target plant species are the preferred technique for herbaceous and small stem woody vegetation. These herbicides are mixed in a thin invert emulsion carrier formulation using low volume backpack sprayers equipped with specialized nozzles to produce ultra fine droplet streams that are selectively applied to foliage of the target plant species. In areas where foliar herbicide applications cannot be conducted selectively while the desirable native vegetation is safely shielded from off target injury they will be applied using mechanical wicking and hand wiping techniques.

Herbicide prescriptions should favor target species using selective formulations, whenever possible and the application schedule sequencing should favor conducting work in the very early spring, immediately after the invasive species express growth or foliage, targeting rosette stage herbaceous species and prior to native bud break occurring on woody species. Preventing complete foliar development on targeted woody plant species render them unsuitable for selection as nesting sites by passerine bird species pre-empting potential for nest disturbance issues during the work sequencing. Late spring and mid-summer follow up applications are necessary to target asynchronous expression of perennial species and warm season annual species. Multiple applications during a season compresses the majority of a multi-year vegetation management schedule into a single season and favorably limits the overall disturbance of the invasive species management operation.



2.2 Control Plan

During treatment we will target invasive plant species found at the site including but not limited to Common Reed (*Phragmites australis*), Japanese Knotweed (*Fallopia japonica*), Oriental Bittersweet (*Celastrus orbiculatus*), Multiflora Rose (*Rosa multiflora*), Japanese Barberry (*Berberis thunbergii*), and Autumn Olive (*Eleagnus umbellata*). These species can be grouped into several categories based on growth, form and characteristics. The categories include rhizomatic perennial species, shrubs, vines, trees and herbaceous annual and perennial species. These groups of invasive species can be addressed with a variety of chemical prescriptions and application techniques depending on their growth stages and the site conditions.

We offer a series of customized management prescriptions, selected from our suite of available tools and application techniques, which will be integrated in the most effective methods to ensure a successful vegetation management program for these species.

The invasive rhizomatic perennial grass species like cattails (*Typha spp.*), common reed (*Phragmites australis*) and reed canary grass (*Phalaris arundinacea*) are best controlled with a combined mechanical mulch mowing and chemical herbicide prescription. Initial control begins with the seasonally appropriate action of herbicide application or any necessary cutting of the invasive species during fall or winter to reduce the above ground biomass and prepare the site for a more efficient spray application to the new growth emerging in late spring. The program continues with two annual applications of the aquatic herbicide Polaris® (Imazapyr) to *Phragmites* and *Phalaris* in the emergent wetland areas where there is standing water present. We propose treating the reed canary grass infestations in the upland areas with a tank mix of the herbicides Rodeo® (Glyphosate) and Plateau® (Imazapic). The herbicides will efficiently translocate into the plant's rhizome system, immediately arresting the growth cycle and limiting the extent of their above ground biomass. It will significantly reduce stem density and effectively control these infestations. The herbicides will be selectively applied to the *Phragmites* and *Phalaris*, using a thin invert emulsion application technique avoiding non-target injury and allowing any suppressed species to flourish once the competition of these species is eliminated.

Purple loosestrife (*Lythrum salicaria*) not impacted by the defoliating Galerucella beetles will be managed using a foliar application of an aquatic labeled herbicide with the active ingredient Triclopyr such as Garlon3A® applied according to the manufacturer's labeled use instructions. This selective herbicide effectively targets broadleaf and woody species without injuring desirable native graminoids and other monocot species. This application should be scheduled when the target plants are in a rapid growth stage prior to flowering and fruit set for effective control and seed suppression.

Japanese knotweed (*Fallopia japonica*) is best controlled by using a foliar application of an aquatic labeled herbicide with the active ingredient Imazapyr such as Polaris® applied according the manufacturers labeled use instructions. The herbicide will efficiently



translocate into the plant's rhizome system, immediately arresting the growth cycle and limiting the extent of their above ground biomass. It will significantly reduce stem density and effectively control the infestations. The herbicide should be selectively applied to the Japanese knotweed, avoiding non-target injury and allowing any suppressed species to flourish once the competition of these species is eliminated. A second application is necessary in the late summer or early fall to control any growth expression following the initial application.

Mature Russian and autumn olives (*Elaeagnus angustifolia* and *Elaeagnus umbellata*), and smooth and common buckhorns (*Frangula alnus* and *Rhamnus cathartica*), also any bush honeysuckles (*Lonicera spp.*) and large diameter Asiatic bittersweet (*Celastrus orbiculatus*) vines present are best controlled using basal bark applications of an herbicide with the active ingredient Triclopyr in an butyl ethoxy ester (BEE) formulation such as Pathfinder II® or Garlon4® mixed in a methylated seed oil carrier. This herbicide is applied using a low volume backpack sprayer to wet the entire circumference of the bottom 12-18 inches of the plant stem and around the root collar where it penetrates the bark into the cambium for phloem mobility and translocates throughout the plant, killing the root system and preventing resprouting after cutting. After treatment, any large specimen trees or shrubs that may present a falling hazard threat should be evaluated for cutting.

The shrub and seedling growth forms of the invasive species Russian and autumn olives (*Elaeagnus angustifolia* and *Elaeagnus umbellata*), smooth and common buckhorns (*Frangula alnus* and *Rhamnus cathartica*), multiflora rose (*Rosa multiflora*), also any bush honeysuckles (*Lonicera spp.*), and Asiatic bittersweet (*Celatrus orbiculatus*) vines present can be successfully managed using a foliar application of a tank mix of the aquatic labeled herbicides with the active ingredients Imazpyr, such as Polaris®, glyphosate, such as Rodeo®, and Metsulfuron methyl, such as Escort XP®, applied according the manufacturers labeled use instructions, where appropriate. In areas where native grass species are at risk of off target injury a foliar application of an aquatic labeled selective herbicide with the active ingredient Triclopyr such as Garlon 3A® should be applied according the manufacturers labeled use instructions. These applications should be scheduled when plants are in a rapid growth stage prior to flowering and fruit set for effective control and seed suppression.

The larger diameter (over two inches) tree, shrub and vine species like Asian bittersweet (*Celastrus orbiculatus*), autumn olive (*Eleagnus umbellata*), winged euonymous (*Euonymous alata*), etc. will be controlled using basal bark applications of an herbicide with the active ingredient Triclopyr in an ester formulation, such as Pathfinder II® or Garlon4®, mixed in a methylated seed oil carrier. This herbicide penetrates the bark and translocates throughout the plant, killing the root system. This application is conducted using a low-volume backpack sprayer to wet the entire circumference of the bottom 12 inches of the stem.



The unique phenology of buckthorns should be recognized to maximize the effectiveness of chemical treatments. Buckthorns are one of the first plants to emerge in the cool temperature of the spring and generally retain their leaves late into October. As a result, treatments can occur in the early spring and late fall when most native species are dormant. Therefore, we can selectively apply multiple treatments throughout the year to maximize mortality, while mitigating damage to native and regenerating species.

The applications of herbicides will be conducted using backpack sprayers to maximize effectiveness and minimize adverse impacts to the native plants and animals. The herbicide will be selectively applied to avoid non-target injury and allow any suppressed species to flourish once these competitive species are eliminated. After the initial treatment is performed and disturbance in the area begins, All Habitat Services will perform multiple site visits and treatments during the remainder of the growing season. The number of return visits will be up to, but not exceeding, two visits unless a specific area of concern is identified.