Massachusetts Bay Transportation Authority

RAPID TRANSIT SYSTEM

2024-2028 VEGETATION MANAGEMENT PLAN

Submitted On FEBRUARY 03, 2024

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I. RAILROAD COVERED BY THIS PLAN

Rapid Transit System, Massachusetts Bay Transportation Authority (MBTA)

This Vegetation Management Plan (VMP) is being submitted on behalf of the MBTA Rapid Transit System who will be implementing this five-year plan which covers the years 2024 through 2028. The Municipalities covered by this plan may be found in (Appendix A).

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The Rapid Transit System of the MBTA consists of three heavy-rail lines, the Red Line, The Orange Line, and the Blue Line. Two light rail lines, the Green Line and the Ashmont-Mattapan High Speed Line that operates as part of the Red Line. There is also the Silver Line which is a bus rapid transit line and is not part of this plan. These lines serve eleven communities in the metropolitan Boston area (see Appendix A).

The heavy rail has a total of 40.76 miles of rail, and the light rail has a total of 26.92 miles of rail for a grand total of 67.68 system rail miles. A total of 19.33 miles runs underground leaving 48.35 miles of aboveground rail which will be treated as part of this plan.

These figures include the Green Line Extension (GLX), which extended the Green Line into Somerville and Medford. It was completed in 2022 adding 4.3 miles of track and seven new stations to the Rapid Transit System.

II. INTRODUCTION

The MBTA operates two passenger rail systems in the State of Massachusetts. The Rapid Transit System managed by the MBTA and The Commuter Rail System managed by KEOLIS.
Each of these rail systems have historically had their own VMP because of the differences between the systems, how they are maintained, and timing of the regulatory approval of the plans. **This VMP covers the Rapid Transit System only**.

This VMP has been prepared in accordance with the regulations set forth by the Commonwealth of Massachusetts, specifically 333 CMR 11.00 Rights-of-Way Management. The objective of 333 CMR 11.00 is to establish a consistent and statewide regulatory process that minimizes the utilization of herbicides in rights-of-way, thereby reducing potential impacts on human health and the environment. However, it also recognizes the importance of selective herbicide use for public safety purposes. The safety of the public and workers is of paramount importance to the MBTA. Adhering to this regulation, the MBTA will employ limited herbicide use to manage vegetation that poses a threat to the safe operation of the Rapid Transit System.

The rights-of-way (ROW) is a transportation corridor—vegetation on or near the ROW is unsafe for riders and employees, damages infrastructure and equipment, and results in service delays.

The Massachusetts Department of Public Utilities (DPU) exercises regulatory oversight of maintenance and inspection of MBTA rail pursuant to M.G.L. c. 161A, section 3(i). Per provisions outlined in Title 49 of Code of Federal Regulations, Part 659, the DPU is the oversight agency which reports to the Federal Transit Administration regarding transit system safety practices and procedures. The ability to effectively inspect and maintain transit system infrastructure is dependent upon proper vegetation control. Accordingly, the MBTA takes direction from the DPU in all matters affecting system safety, including vegetation management.

Historically, the transportation rights-of-way has been treated with herbicides. This practice dates to the 1950's when herbicides were applied at active ingredient (A.I.) rates as high as 100 lbs. per acre. Over time, chemistries and application methodologies changed. By the mid 1980's rates were down to 6-8 A.I. lbs. per acre. Beginning in 2006 a new program of selective weed control was implemented by the MBTA for the roadbed weed control portion of the program (see Exhibit A, B & C). Utilizing low pressure technology, with both spray booms and handheld backpacks covering the entire ballast area and only treating weeds that had emerged and were green. This approach helps the MBTA reduce the amount of herbicide applied to its lowest effective rate. This approach eliminated most broadcast spraying of the roadbed.

Since 2019 the predominate method of treatment has been by backpack application, lighter target density and treatment timing flexibility makes this a more desirable approach. Shoulders and ditches are also treated this way because certain low growing vegetation is acceptable in these

areas. Hi-rail broadcast and hand broadcast treatment is reserved for specific hard to control areas on the railbed. With this more selective methodology, rates lower than 3 lbs. A.I. per acre are now achievable. Another important historical change is the soil persistence of chemicals. Herbicides used in the 1950's were very persistent in the soil, not breaking down for long periods of time. Current herbicides approved for use in Massachusetts in sensitive sites break down quicker and are not bio-accumulating. The MBTA only uses herbicides on the right of way that are approved by the Massachusetts Department of Agriculture (MDAR) for use in sensitive sites.

III. GENERAL STATEMENT OF GOALS AND OBJECTIVES

The railroads have a regulatory obligation to ensure the safe and reliable delivery of services. The primary goal of this Vegetation Management Plan (VMP) is to eliminate vegetation along the ROW that poses any real or potential threat, including the risk of injury, illness, or damage to personnel, facilities, equipment, rolling stock, infrastructure, and the environment, as defined by 49 CFR 673.5. By doing so, the plan ensures compliance with the safety requirements set by the Federal Railroad Administration (FRA).

This VMP has several key objectives:

1. Manage and control vegetation to mitigate unreasonable adverse effects on human health, the environment, and public safety.

2. Protect the safety of individuals utilizing or working on the ROW, as well as those residing adjacent to it.

3. Facilitate the safe and efficient transportation of passengers.

As part of the Rights-of-Way Management Program (333 CMR 11.01: Purpose (1)), one specific goal is to implement an Integrated Pest Management (IPM) approach to vegetation management on all covered rights-of-way. IPM, as defined by the American National Standards Institute (ANSI, A300 Part 7), is considered an Integrated Vegetation Management (IVM) approach. Therefore, this VMP incorporates professional guidelines and procedures that adhere to an IVM approach. The following objectives guide the implementation:

- Maintain a vegetation-free ROW to ensure safe operations and meet federally required inspections.
- Safeguard the transportation of passengers by maintaining safe and reliable conditions.
- Preserve the reliability and resilience of railroad assets.

• Maintain clear lines of sight to protect employees, passengers, and neighboring communities.

The VMP serves as a comprehensive resource, providing essential information and general procedures to municipalities, interested citizens, railroad employees, and contractors. It outlines the railroad's VMP for the years 2024-2028.

IV. VEGETATION MANAGEMENT REGULATORY FRAMEWORK

In railroad transportation, safety forms the cornerstone of operations. Various Federal enabling acts are in place to enforce safety in the railroad industry, including:

• 49 USC § 10501 - Interstate Commerce, Railroad Safety
• 49 USC § 20106 - National Uniformity of Regulation for "Railroad Safety and Security"
• 49 CFR § 213 - FRA Safety Requirements
• 45 CFR § Parts 659; 674 - FTA Safety Requirements

Furthermore, specific regulations from the Federal Railroad Administration (FRA), under the Department of Transportation (DOT), address railroad safety and the management of vegetation along the right-of-way (ROW) in 49 C.F.R. §213.37. This regulation states that vegetation on or immediately adjacent to the railroad property shall be controlled to prevent:

(a) Become a fire hazard to track-carrying structures.

(b) Obstruct visibility of railroad signs and signals:
(1) Along the right-of-way, and
(2) At highway-rail crossings.

(c) Interfere with railroad employees performing normal trackside duties.

(d) Prevent proper functioning of signal and communication lines; or

(e) *Prevent railroad employees from visually inspecting moving equipment from their normal duty stations.*

The Massachusetts Department of Agricultural Resources (MDAR) initiated a Generic Environmental Impact Report (GEIR) to evaluate alternatives for rights-of-way management. An advisory task force, consisting of environmentalists, agencies, and rights-of-way managers, assisted in the preparation of the GEIR. Based on the study's findings, the task force recommended a coherent state-wide

regulatory program for rights-of-way to the Secretary of Environmental Affairs. In 1986, MDAR published draft regulations to implement this program, which received extensive public feedback. The Rights-of-Way Management Program, under the jurisdiction of DFA [333 CMR 11.00], came into effect on July 10, 1987.

During the review process, the MassDEP collaborated closely with MDAR to include provisions that afford maximum protection for water supplies and wetlands, as provided under M.G.L. c. 131, § 40 and 310 CMR 10.00. Specifically, the Rights-of-Way Management Program regulations presume that work conducted in accordance with a Vegetation Management Plan (VMP) and Yearly Operational Plan (YOP), as required by 333 CMR 11.00 regulations, will not impact an area protected under M.G.L. c. 131, § 40.

The overarching purpose of the Rights-of-Way Management regulation is to establish a statewide and uniform regulatory process that minimizes herbicide use and potential impacts on human health and the environment within rights-of-way. Simultaneously, the regulation recognizes the benefits of selective herbicide use for public safety. The specific goals of 333 CMR 11.00 are as follows:

(1) Ensure the utilization of an Integrated Pest Management (IPM) approach for vegetation management on all covered rights-of-way.
(2) Establish standards, requirements, and procedures to prevent unreasonable risks to humans or the environment, considering the economic, social, and environmental costs and benefits of pesticide use.
(3) Allow sufficient opportunities for public and municipal agency input regarding the potential impacts of herbicide application in environmentally sensitive areas within rights-of-way.
(4) Establish a mechanism for public and municipal review of rights-of-way maintenance plans.

V. VEGETATION REQUIREMENTS OF RAILROAD RIGHTS-OF-WAY

The MBTA Rapid Transit System is unique among railroads in Massachusetts. It is a self-contained metropolitan passenger rail system that exclusively uses its own equipment and operates from 5:00 AM until 1:00 AM everyday with trains running every 6 – 12 minutes. No other railroad operates on these rails and no freight is carried.

Furthermore, maintenance of vegetation along the railroad rights-of-way (ROW) is subject to strict schedules dictated by established routes, necessitating careful coordination with railroad traffic logistics. Additionally, the execution of herbicide and mechanical vegetation control activities may be hindered by other essential maintenance tasks. Unlike the maintenance and vegetation control of utility distribution lines and vehicle rights-of-way, railroad operations and the timing of maintenance activities present unique challenges. The notable differences include:

• Railroad tracks facilitate continuous transportation from station to station, offering limited flexibility to avoid operational impacts or interruptions. Alternative tracks for diverting rail traffic are not readily available.

• Coordinating chemical and mechanical applications necessitates collaboration among Maintenance of Way, Safety, and Dispatch controls. This dynamic and ever-changing system of operational priorities presents challenges for planning and executing the vegetation management program.

• General maintenance activities, including vegetation management, face challenges during construction projects and outages.

• The boundaries of railroad rights-of-way (ROW) and property lines differ across various cities and towns, adding complexity to ROW management.

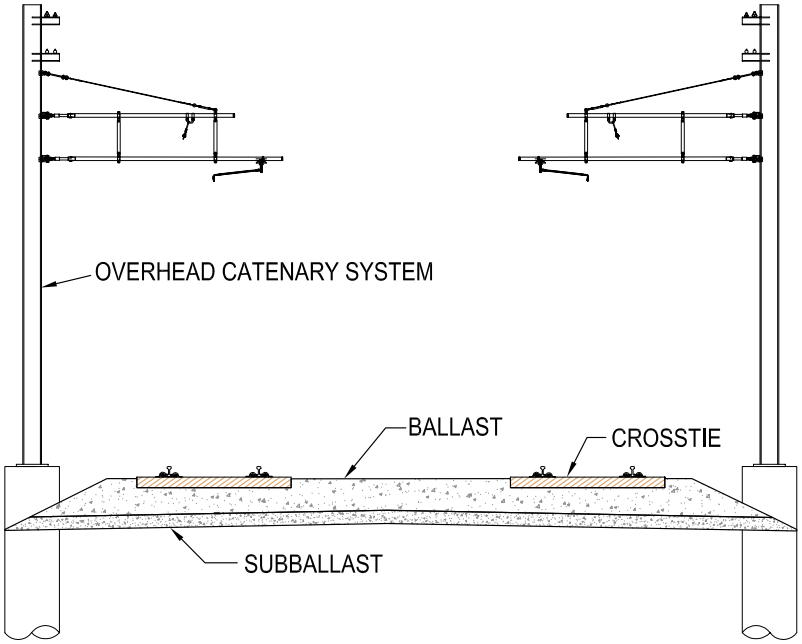
1. RAILROAD INFRASTRUCTURE OVERVIEW

The railroad system is a complex transportation network that encompasses various infrastructure elements crucial for the functioning of rail operations. According to federal regulations, vegetation control is required in specific areas along the railroad. These areas include:

- Ballast section (Roadway)
- Ballast shoulder (Roadway)
- Yards (Roadway/Facilities)
- Overhead Catenary, switches, signals, and signs (Roadway Infrastructure)
- Highway grade crossings
- Bridges, bridge abutments, and buildings
- Off-track areas
- Inside of curves

The railroad roadway encompasses the roadbed, ditches, shoulders, and adjacent assets within the railroad property lines. The roadbed is the substructure that supports the rail tracks (superstructure). It consists of ties, which can be made of treated wood or concrete, placed over ballast on a graded and compacted earthwork section. The substructure is designed to bear the weight of the track structure and traffic. The earthwork section typically slopes downward, leading to drainage ditches on either side of the roadbed. The entire roadbed and adjacent areas, including the ditches, shoulders, and edges are designed to facilitate proper water drainage away from the tracks. (See Exhibit B & C)

Exhibit A: Visual of Rail Components



2. VEGETATION IMPACTS ON RAILROAD ROW

Vegetation control is one of the most important safety measures implemented to reduce the risk of direct impacts to rail transit and the indirect impacts that over time reduce the functionality of railroad systems and infrastructure critical to operations.

Direct Impacts:

Derailments are caused by saturated rail beds and fallen trees or branches on tracks. Vegetation that falls along the track structure while trains are in transit can cause derailments and pose a high risk to the safety of employees, passengers, and the environment. These incidents can result in major injuries or death, impact to environment, and millions of dollars in damage, repair, and replacement of assets.

Slippery Rail is caused by the fall of leaves on track structure. This occurs when tree canopies grow near and encroach on the roadway and overhead catenary dropping leaves and branches. The leaves inhibit the proper brake functions of rail transit cars. This significantly impacts the

performance of operations at times, causing speed restrictions and significant delays in schedule of service. Trains depend on friction between the steel rails and steel wheels for traction and braking. Anything that reduces friction between the wheels and rails can create dangerous problems for trains in transit or maintenance crews on hi-rail equipment. Leaves in the fall are crushed between the wheel and rail releasing water and plant sap which acts as a lubricant. This directly affects the braking/stopping distances required depending on the train's weight, speed, and the slope involved.

Line of sight and clear visibility is important both for railroad personnel working on or near trains and for motorists crossing railroad tracks. Train engineers and other operating personnel must be able to see all types of railroad signals. These signals indicate the status of the traffic on the track ahead and indicate when whistles must be sounded as the train approaches a road crossing. Signs provide other types of safety information as well. Motorists must be able to see trains as they approach railroad crossings and employees must be able to visually inspect moving rail equipment. Locomotive engineers must be able to see around curves and see that switches and derails are in the correct position. Standard railroad safety protocols require vegetation control to ensure proper functioning of signals and communication lines. Trees and plants can short out electrical equipment and cause failure of communication systems and signals.

In dry weather, vegetation within and along the roadbed is easily set on fire by sparks from steel brake shoes on steel wheels. Track maintenance activities such as cutting, grinding, or welding rail are another ignition source. To minimize the potential for fires, the Commonwealth of Massachusetts requires by statute (Section 160 Chapter 235A) that railroads keep the full width of their rights-of-way clear of flammable material including vegetation.

INDIRECT IMPACTS:

Vegetation within the railroad roadbed increases the probability that a track or roadbed defect will go undetected resulting in greater potential for an accident or incident. Of primary importance to the railroad industry is minimizing the frequency and severity of accidents and incidents that can result from undetected track and roadbed defects. The inspections are normally done by walking inspections of switches and other complicated track work. It is essential that the railroad roadbed be kept weed free to provide the track inspector with unobstructed views of the track structure.

As well, vegetation in the roadbed hinders other methods of track inspection as well. Railroads employ electronic rail testing contractors to periodically test rails for internal defects. This testing is done by special rail cars that establish a magnetic field around the rail. Vegetation adjacent to the rails hinders this process and results in invalid tests. Other special rail cars measure track geometry such as surface, alignment, and gage. The gage measurement is done optically and is adversely affected by vegetation between the rails.

Some other impacts from vegetation are not easily detected, such as long-term impacts of vegetation to the roadbed amongst others. The roadbed consists of crushed stone or gravel (the ballast) and is compacted around and under the rail ties to support them vertically and laterally. Pore space in the ballast allows water to drain away from the ties and into drainage ditches, which carrys the water away from the track. Media or soil that encourages weed germination and establishment falling from passing trains or washed and/or blown in can accumulate and create a seedbed for some plants. Plant seeds carried to the track area by the same mechanisms as the soil can sprout and begin to develop. During plant development, fibrous root systems grow and expand through the ballast and accumulate additional dirt. The fibrous roots of most plants are continuously dying and renewing themselves adding decaying plant material to the accumulating soil. Because of this accumulated soil and plant material the drainage capacity of the ballast is greatly reduced, and moisture is retained around the ties contributing to their decay. During rain, the fouled ballast can retain enough moisture to become saturated. This results in a loss of support for the track both vertically and laterally leading to movement under the train that can cause deflection of the rail. A rail deflection while trains are in transit can be a direct risk of derailment.

Vegetation also creates unsafe conditions for railroad workers, particularly crews that may be at work at any hour and in any weather, who require clear access to railroad assets and are conducting maintenance activities. The vegetation itself may be the hazard or it may conceal objects or areas of unsafe footing.

Exhibit B: Railbed Cross-section Detail

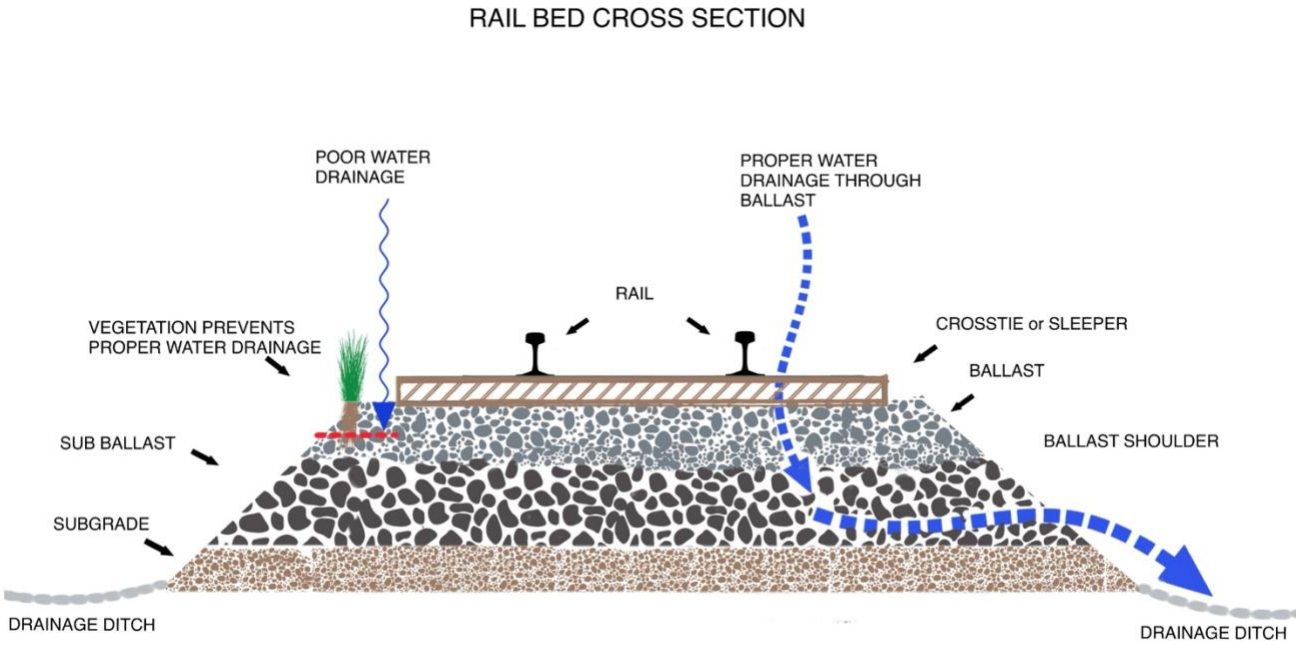
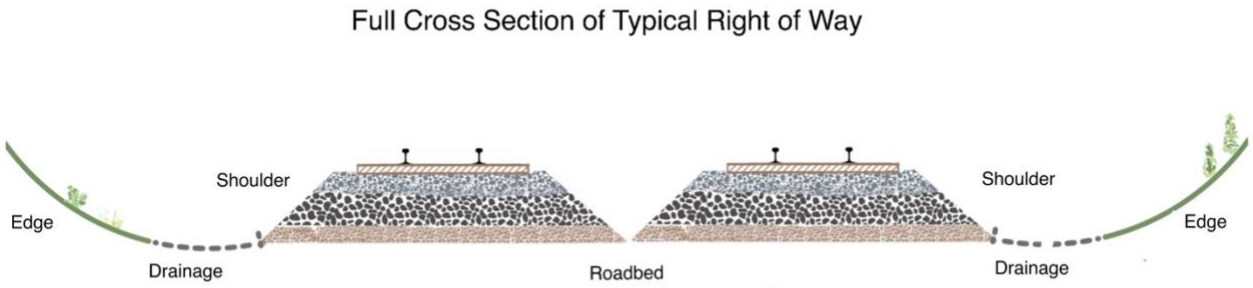


Exhibit C: Full Right of Way Cross Section



VI. INTEGRATED VEGETATION MANAGEMENT

The railroad's Integrated Vegetation Management (IVM) program is designed to address public, environmental, and economic concerns by minimizing the use of herbicides. Given the unique nature of the railroad right-of-way (ROW), different environmental areas such as road crossings and yards, as well as railroad utility assets, require varying levels of vegetation control. These areas will be selectively managed based on site conditions and target species. A team of professionals, including track engineers, arborists, environmental scientists, vegetation control specialists, and herbicide application specialists, work together on a complex schedule to execute the Yearly Operational Plan. The plan incorporates a combination of control methods based on annual site assessments. Over the course of five years, the railroad will monitor and evaluate the program's success and integrate appropriate methods into their Yearly Operational Plans in line with this Vegetation Management Plan (VMP).

IVM is a strategy intended to strike a balance between safe, reliable, and cost-effective vegetation management while minimizing risks to human health and the environment. The program discourages the regrowth of vegetation through selective chemical and mechanical treatments.

Benefits of the IVM program include:

- Overall reduction in vegetation management costs over time.
- Increased effectiveness of long-term vegetation control and management
- Reduced environmental impacts on land, water, habitat, and wildlife.
- Decreased environmental and health risks.

1. IVM METHODOLOGY

MBTA'S IVM program incorporates a combination of methods to manage vegetation along it's rights of way. These methods are as follows:

A. PHYSICAL CONTROL METHODS: Mechanical and/or manual removal of vegetation is crucial for areas along the ROW. Throughout the year, this method is used to trim or remove mature trees to increase sun exposure for improved drying of tracks and reduce leaf debris on and around rails, enhancing brake effectiveness and reducing slippery rail conditions. Remove woody vegetation that cannot be treated with herbicides from obstructing line of sight from populated areas, stations, curves, signals, crossings, etc. Reduce or eliminate vegetation along the ROW in no spray areas where chemical controls are not feasible.

B. CHEMICAL CONTROL METHODS: Chemical herbicides are used along the railroad ROW for vegetation control. Only chemicals listed in the Massachusetts Department of Agricultural Resources (MDAR) Rights-of-Way Sensitive Area Materials List are utilized. Preemergent application can start in April when soil temperatures are appropriate, postemergent can start in May, while shrubs and small trees are treated after mid-June through summer/fall. Spot treatment is employed as needed throughout the year.

C. NATURAL, CULTURAL, BIOLOGICAL METHODS: Of these methods natural control is the only, practical method along railroad ROWs. Natural control is achieved by creating stable communities of low growing vegetation by initially treating undesirable plants with herbicides. Over time herbicide use is reduced or eliminated because these communities tend to resist invasion of other plants. It can be employed along the rail edge in limited areas.

To date, no environmentally and economically feasible and safe alternatives to herbicides have been developed for areas of the right-of-way that require total vegetation control. In 2008 the University of Massachusetts Transportation Center performed a study of herbicide alternatives Sponsored by the Executive Office of Transportation and Public Works (EOT) titled "Herbicide Alternatives Research". (https://www.umass.edu/mcrp/pdfs/Herbicide%20Alternatives.pdf) They examined multiple alternatives to herbicides and the end result quoted from the study: "Because of the cost of materials and labor and need for repeated seasonal applications, all of the alternative practices will cost substantially more than the use of conventional herbicides."

As a result, the integrated approach to vegetation management in these areas is primarily limited to the selective application of herbicides targeting specific vegetation, along with physical controls achieved through track maintenance activities.

In summary, the railroad's VMP is designed as an integrated management program that incorporates the most effective technologies and best management practices to apply only the necessary amount of herbicide to control the vegetation. The VMP does not follow a fixed application schedule due to the complex logistics involved in planning and coordinating annual maintenance activities. The maintenance activities along the railroad right-of-way (ROW) are influenced by various factors, including site conditions, inspection findings, and specific vegetation targets that need to be addressed in the roadway and adjacent overhead areas. All applications are done in compliance with the herbicide label and MDAR's Right of Way Sensitive Area Material List restrictions.

As a best management practice, there are instances where regular maintenance activities such as rail tie and ballast replacement can eliminate the need for vegetation controls like chemical applications or mechanical methods in certain areas, for a season. These considerations are planned as part of the Yearly Operational Plan (YOP), ensuring that vegetation control activities are scheduled only in locations identified through field assessments where the Integrated Vegetation Management (IVM) approach should be implemented. (Refer to the Operational Procedure, Section VIII for more details on this process).

2. VEGETATION MANAGEMENT SPECIFIC to RAILROAD ROW

All vegetation that impedes the operational and functional requirements of the rapid transit system as stated in this VMP shall be eradicated or otherwise managed either mechanically or chemically.

Exhibit A and Exhibit C provide a visual representation of a typical railroad rights-of-way (ROW) roadway cross-section and the areas designated for vegetation control. These edge areas generally extend from the roadbed to the boundaries of the ROW property on each side. Vegetation growing in the edge area of the right of way will be managed by hand application to promote the growth of low-growing shrubs and herbaceous plants whenever feasible. These shrubs serve as a visual screen, blocking the view of railroad traffic, and help reduce noise from passing trains in neighboring areas. However, it's important to note that the extent of the railroad ROW property boundaries varies significantly between different cities and towns, which impacts the implementation of vegetation controls in those areas.

Along the sides of the railroad rights-of-way (ROW), there are areas that house crucial infrastructure such as overhead signal and communication lines, positive train control lines, and other railroad assets. It is necessary to eliminate vegetation in these areas to ensure unobstructed access for general maintenance and to prevent any disruptions in service. In these specific zones, the selective application of herbicide approach aims to promote the growth of low-growing shrubs and herbaceous plants, while minimizing the intrusion of tall trees. However, it is important to remove

any tall trees growing near the overhead signal and communication lines to maintain the safety of railroad operations.

Vegetation on the area along and within the ROW must be controlled in the following situations.

A. Roadbed:
Exhibit B illustrates a typical railroad right-of-way (ROW), specifically the roadbed section. The roadbed consists of various components including the rail, ties, ballast, ballast shoulder, and a drainage system. The ballast and ballast shoulder are constructed using durable stone materials that provide support to the track and distribute the load evenly. They also facilitate water drainage away from the roadbed. The roadbed's drainage system is designed to carry water away from the track. **Vegetation in the roadbed area must be eliminated.**

B. Bridges:
Open or porous deck bridges over wetlands or water, will not be treated with herbicides. However, the roadbed approaches to bridges will be treated up to the abutment backwall, ensuring appropriate setbacks to sensitive areas. Stonework in bridge abutments and similar structures will be treated to prevent plant roots from loosening and damaging mortar in cracks.

C. Culverts:
Culverts, typically made of steel, concrete, clay, or stone, are usually positioned at right angles to the track. Culvert ends that are not long enough to extend beyond the spray pattern of herbicides, will not be treated with herbicides when wet, or proper buffers cannot be maintained. Instead, mechanical and/or manual methods of vegetation removal will be employed.

D. Ditches:
Maintaining vegetation-free ditches is essential for effective water flow away from the ballast and track structure, ensuring a stable roadbed. Mechanical means and herbicide applications (when water is not present) will be utilized to maintain ditches. Ditch maintenance is crucial for preserving their functionality. Excessive vegetation, talus, and erosional deposits will be removed to maintain proper drainage. Ditches that have wet conditions will not be treated with herbicides and will be managed using mechanical and/or manual methods.

E. Grade Level Road Crossings:
Vegetation at grade level road crossings must be controlled using chemical and/or mechanical methods to ensure clear visibility for motorists and rail traffic, enhancing safety.

F. Railroad Signals, Signal Cases, and Signs:

The area surrounding railroad signals, signal cases, and signs will be kept free of weeds to ensure clear visibility for engineers and permit access for equipment maintenance. Chemical and/or mechanical methods will be employed in these areas.

G. Inside Curves:
Vegetation control is necessary on the inside of curves, adjacent to the shoulder, to enable railroad employees on trains to conduct inspections as they navigate curves and to ensure unobstructed line of sight. Chemical and/or mechanical controls will be used in these areas.

H. Signal Systems and Communication Lines:
Railroad utility lines along the roadway, including signal control houses, gate and signal mechanisms, battery housings, Positive Train Control (PTC) equipment, communication lines, and others, must be free of woody vegetation and brush. This clearance is essential for safe usage, maintenance access, and protection of assets from damage caused by vegetation encroachment. Chemical and/or mechanical controls will be applied to maintain clearances above, adjacent to, and below utility lines.

VII. VEGETATION MANAGEMENT TECHNIQUES

The railroad's Vegetation Management Program (VMP) is constrained by its rights-of-way which is owned in fee. Federal and State regulations prohibit any vegetation on the ROW roadbed and other specialized areas as indicated in Exhibit C of Section V. However, in other areas of the ROW, selective management of certain woody, vine, and brush species is necessary. Therefore, the railroad's ROW management methods are primarily limited to two vegetation control techniques—chemical (herbicide) applications and physical (mechanical, manual, and other) techniques.

A. Physical Methods for Vegetation Control:

Mechanical equipment and techniques are employed for vegetation control, focusing on woody and brush vegetation, and targeting trees that interfere with the ROW. Mechanical techniques primarily clear vegetation in areas adjacent to the roadbed, where it obstructs communication lines, hampers visibility, and encroaches into the track zone. Mechanical control is utilized to remove unwanted woody vegetation in areas where herbicide application is restricted.

Mowing is a mechanical process that involves cutting grass, herbaceous, and woody target species using cutting heads mounted on hydraulic arms, which significantly extend the equipment's lateral reach. These machines can be mounted on off-track, on-track, or hi-rail equipment. Due to the diverse conditions found on the ROW, large machines are required for railroad applications. On-track equipment has the advantage of operating on smoother terrain,

while off-track equipment can work independently of train movement. However, their movement over rough terrain may limit production. Off-track equipment also allows operation under communication and signal lines. However, the use of brush cutters may be restricted in developed or recreational areas to adhere to railroad safety guidelines. Arborists are consulted to ensure a targeted approach to Integrated Vegetation Management (IVM), considering hazardous conditions, defective trees (in accordance with ANSI A-300 standards), and identification of invasive species.

B. Chemical Application:

Herbicides are employed to control unwanted vegetation. Herbicides have been extensively used on railroad ROWs due to their specificity, effectiveness against a range of target species, control capabilities, economic viability, and application methods.

Herbicides are crucial for vegetation elimination on the ROW roadbed (i.e., the ballast/shoulder area). No mechanical method has been found to be adequate for vegetation control on the ROW roadbed as required by Federal and Massachusetts laws and regulations. The ballast and shoulder must be completely free of vegetation, including the root system, necessitating the use of herbicides.

An herbicide application control program may be adapted into an integrated vegetation management approach depending on factors such as the treatment area, target species, timing of application, and herbicide category. Herbicides are categorized as pre-emergent, which the plant absorbs before emerging from the ground through developing roots and/or shoots, and post-emergent, which the plant absorbs through foliage, green portions, or woody parts like bark, stems, or roots.

Target species will be divided into two categories: First, herbaceous weeds and grass, and second, woody vegetation.

Herbaceous Weeds and Grass Control:

This program is specifically designed to eliminate all vegetation found in various areas, including the roadbed, around signs and signals, as well as in yards and other railroad facilities. The predominant vegetation consists of herbaceous plants and grass, with a smaller presence of shrubs and tree seedlings. To achieve complete vegetation eradication, a combination of preemergent and postemergent herbicides is employed. This approach effectively targets both the germinating vegetation and the existing plant growth, ensuring comprehensive control.

Preemergence Herbicide Program:

The preemergence herbicide program focuses on controlling vegetation before it emerges on the track roadbed and within the railroad yards. The timing of preemergent herbicide applications in a particular main line or yard track section is determined based on an assessment of vegetation density and control efforts from the previous year, as well as an estimation of vegetation density for the upcoming season. In Massachusetts, preemergence herbicide applications are weather-dependent and require favorable weather conditions to be effective. If weather conditions change, such as high winds, rain, temperature variations, or inversions, the applicator will immediately halt the spraying process. Under favorable weather conditions, preemergent treatments may commence as early as March depending on soil temperatures, but more typically in April.

Postemergence Herbicide Program:
The postemergence herbicide program primarily targets vegetation eradication along the railroad's main lines and branch lines within the rights-of-way (ROW). These areas constitute the majority of the railroad's ROW and account for the largest proportion of herbicide use.

Postemergence herbicide applications typically begin in spring, but the timing is subject to weather conditions and the specific target species. Treated areas are later inspected to assess the effectiveness of the treatment. If necessary, a second treatment is selectively applied to areas with remaining vegetation, in accordance with CMR 333 11.03(8).

Application methods for both preemergent and postemergence herbicides are by low pressure delivery, utilizing backpack sprayers, hand operated hydraulic sprayers, or hydraulic hi-rail spray trucks. These hi-rail trucks are equipped with a rear-mounted boom positioned approximately 18 inches above the ground. The spray nozzles are designed with spring-loaded shut-off valves to prevent dripping when the pressure is turned off.

Low pressure delivery is typically between 30 and 50 pounds per square inch (PSI). Low pressure, as defined by CMR 333 11.02, remains below 60 PSI.

Woody Vegetation Control:

The brush control program focuses on managing vegetation in edge areas adjacent to the shoulder through the selective use of postemergence herbicides. The choice of herbicide depends on the species of target vegetation present, while the application method depends on the density of the target vegetation and previous mechanical control measures. Whenever possible, shrubs and herbaceous vegetation in these areas are maintained. To address weed resistance over time, the MBTA incorporates multiple herbicide modes-of-action (MOA) from the (MDAR) Sensitive Areas Materials list into its Yearly Operating Plan (YOP). This gives the Vegetation Manager the flexibility in choosing the right material for the area being treated.

Various methods are employed to apply postemergent herbicides directly to the target vegetation. These methods include:

- Foliar Application:

Selective application of herbicide to the foliage using low-pressure mechanical spray devices.
This method is suitable for busy, high-speed rail lines where shorter work intervals between trains restrict the use of slower mechanical methods.
The herbicides are applied under low pressure, (below 60 PSI).
Selective foliar application is not used on vegetation exceeding 12 feet in height, except for side trimming.
Side trimming involves selectively applying herbicide to specific portions of a tree, avoiding complete tree removal.
Low-pressure herbicide application techniques and appropriate adjuvants are utilized during side trimming operations in residential areas to minimize herbicide drift.

- Basal Stem Application:

Selective application of herbicide in a crop oil base carrier to the lower portion of the main stem (trunk) of a tree. The equipment for basal spraying is often a manual-pump apparatus.

- Cut stem:

Application of an herbicide to the stump immediately after a cutting procedure. Traditionally, the herbicide is manually painted or squirted directly onto the cut stump surface.

To summarize, the postemergent herbicide program aims to control woody vegetation in adjacent areas and typically begins in spring, continuing throughout the year, utilizing appropriate methods, in selective sections of the right-of-way (ROW) as part of the railroad's vegetation control program. Stem and cut surface treatments are effective year-round. As with weed control, all treated areas are later inspected and evaluated. If further treatment is necessary, a post-emergent herbicide is selectively applied to unwanted vegetation. Every effort is made to minimize herbicide use while ensuring the overall safety of the ROW system.

The use of herbicide applications on the ROW system are necessary for the transit system to operate safely. The registration of herbicides specifically labeled for use on ROWs by the EPA and Commonwealth of Massachusetts, based on risk analysis, further supports their continued use. When applied by a Massachusetts certified applicator (in the category Right-of-Way Pest Control) according to label directions and in compliance with all Federal and State laws and regulations, including an approved Vegetation Management Plan (VMP) and Yearly Operating Plan (YOP), a herbicide selected from the Department of Agricultural Resources (DAR)/Department of Environmental Protection (DEP) recommended list is expected to have no unreasonable adverse effects on the general public and the environment. Many mechanical techniques pose real dangers and risks to both the public and workers. As mentioned before, no adequate mechanical method is available for controlling vegetation on the ROW roadbed and other areas that must remain

vegetation-free. Public and employee safety begins with the federally and state-mandated requirements to visually inspect the entire ROW. Herbicides provide the most reliable and generally safe method to prevent and remove weeds that hinder these inspections. Mechanical cutting may also result in property damage to adjacent landowners caused by flying limbs and debris.

Given the wide variety herbicide formulations, the Vegetation Manager can choose the most effective herbicide for each specific site and target vegetation. This allows for selective eradication of the target plant while minimizing impacts on non-target, desirable species. Limited and selective application of herbicides reduces the risk of unreasonable adverse effects on the public and the environment. The applicator has control over pressure, nozzle selection, and vehicle speed along the ROW.

Highly trained, certified and licensed professional applicators, assisted by on-site railroad personnel, will apply herbicides chosen from the state recommended Rights of Way Sensitive Materials List (https://www.mass.gov/info-details/rights-of-way-sensitive-area-materials-list) [333 CMR 11.04 (1) (d) as applicable] specifically for the target vegetation and site. By utilizing state-of-the-art equipment and specific adjuvants, the applicator will be sensitive to the environment while efficiently and economically managing the vegetation along the ROW.
According to Massachusetts Regulation 333 CMR 10.14, the applicator is required to maintain daily records of herbicide spraying operations. These records include information about herbicide/adjuvant mixture components and proportions, equipment used, application rate, precise locations of treated and non-treated tracks and adjacent areas, application dates, trade names of products, EPA registration numbers, applicator names, and target pests.

VIII. SENSITIVE AREAS VEGETATION MANAGEMENT

Sensitive Areas have been defined in the Commonwealth of Massachusetts Regulation 333 CMR 11.04. A copy of the regulations is included in Appendix C. As described in 333 CMR 11.04, sensitive areas include any areas within the ROW including No Spray Area, and Limited Spray Area as defined below.

No Spray Area, any area that is both within a Right-of-Way and within:

a. any Zone I;
b. 100 feet of any Class A Surface Water Source;
c. 100 feet of any tributary or associated surface water body where the tributary or associated surface water body runs within 400 feet of a Class A surface water source;

d. 10 feet of any tributary or associated surface water body where the tributary or associated surface water body is at a distance greater than 400 feet from a Class A surface water source;
e. a lateral distance of 100 feet for 400 feet upstream, on both sides of the river, of a Class B Drinking Water Intake;
f. 50 feet of any identified Private Well;
g. 10 feet of any Wetlands or Water Over Wetlands;
h. 10 feet of the mean annual high-water line of any river; and 10 feet of any Certified Vernal Pool.

Limited Spray Area, any area that is both within a Right-of-Way and within:

a. any Zone II or IWPA;
b. a distance of between 100 feet and 400 feet of any Class A Surface Water Source;
c. a distance of between 10 and 200 feet of any tributary or associated surface water body where the tributary or associated surface water body runs outside the Zone A for the Class A surface water source;
d. a lateral distance of between 100 and 200 feet for 400 feet upstream, on both sides of the river, of a Class B Drinking Water Intake;
e. a distance of between 50 and 100 feet of any identified Private Well;
f. a distance of between 10 and 100 feet of any Wetlands or Water Over Wetlands;
g. a distance of between 10 feet from the mean annual high water line of any river and the outer boundary of the Riverfront Area;
h. a distance of between 10 feet from any Certified Vernal Pool and the outer boundary of any Certified Vernal Pool Habitat; and a distance of 100 feet of any Agricultural or Inhabited Area.

The most common types of sensitive areas encountered are areas within 100 feet of standing or flowing water or wetlands.

Those sensitive areas that have been delineated with permanent markers in the field include all areas listed above under No Spray Areas and Limited Spray Areas with the following exceptions: agricultural areas, inhabited areas, and areas of intermittent standing or flowing water such as in drainage ditches. These areas are considered readily identifiable in the field and are not delineated with permanent markers.

Within "sensitive areas” only a limited number of herbicides that have been approved for these areas by MDAR and DEP can be applied. Additionally, no herbicides, including those of which are approved for sensitive areas, can be applied within 10 feet of standing or flowing water.

A. Identification and Location of Wells and Surface Water Supplies

The Commonwealth of Massachusetts, Department of Environmental Protection, Drinking Water Program has developed data and overlay maps highlighting public water supplies, aquifers, tributaries, and drainage basins for most of the State. Areas not covered are clearly identified in the field and mapped accordingly.

Local sources of specific information included the Conservation Commissions, Water Departments, and Boards of Health. Private wells on record in MDAR's Private Well Registry will be delineated. The identification and delineation of private wells in the Commonwealth of Massachusetts is an ongoing process. In addition to the registry a yearly written inquiry to the Board of Health in each municipality, regarding the existence of any new and/or omitted private wells, is included in the Yearly Operational Plan mailing.

Prior to field delineations topographic maps were marked identifying the locations of public wells and surface water supplies. The specific locations were obtained from MassGIS overlay maps provided by the DEP and the Drinking Water Program.

B. Identification and Delineation of Wetlands

The following definition and description is from the Wetlands Protection Act Regulations 310 CMR 10.55 (2):

Definition, Critical Characteristics and Boundary

1. Bordering Vegetated Wetlands are freshwater wetlands which border on creeks, rivers, streams, ponds and lakes. The types of freshwater wetlands are wet meadows, marshes, swamps and bogs. Bordering Vegetated Wetlands are areas where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants. The ground and surface water regime and the vegetational community which occur in each type of freshwater wetland are specified in M.G.L. c. 131, § 40.

2. The physical characteristics of Bordering Vegetated Wetlands, as described in 310 CMR 10.55(2)(a), are critical to the protection of the interests specified in 310 CMR 10.55(1).

3. The boundary of Bordering Vegetated Wetlands is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist. Wetland indicator plants shall include but not necessarily be limited to those plant species identified in the Act. Wetland indicator plants are also those classified in the indicator categories of Facultative, Facultative+, Facultative Wetland-, Facultative Wetland, Facultative Wetland+, or Obligate Wetland in the National List of Plant Species That Occur in Wetlands: Massachusetts (Fish & Wildlife Service, U.S. Department of the

Interior, 1988) or plants exhibiting physiological or morphological adaptations to life in saturated or inundated conditions.

4. Areas containing a predominance of wetland indicator plants are presumed to indicate the presence of saturated or inundated conditions. Therefore, the boundary as determined by 50% or more wetland indicator plants shall be presumed accurate when:

    a. all dominant species have an indicator status of obligate, facultative wetland+, facultative wetland, or facultative wetland- and the slope is distinct or abrupt between the upland plant community and the wetland plant community;
    b. the area where the work will occur is clearly limited to the buffer zone; or
    c. the issuing authority determines that sole reliance on wetland indicator plants will yield an accurate delineation.

5. When the boundary is not presumed accurate as described in 310 CMR 10.55(2)(c)1.a. through c. or to overcome the presumption, credible evidence shall be submitted by a competent source demonstrating that the boundary of Bordering Vegetated Wetlands is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist. The issuing authority must evaluate vegetation and indicators of saturated or inundated conditions if submitted by a credible source, or may require credible evidence of saturated or inundated conditions when determining the boundary. Indicators of saturated or inundated conditions sufficient to support wetland indicator plants shall include one or more of the following:

    a. groundwater, including the capillary fringe, within a major portion of the root zone;
    b. observation of prolonged or frequent flowing or standing surface water;
    c. characteristics of hydric soils.

6. Where an area has been disturbed (e.g. by cutting, filling, or cultivation), the boundary is the line within which there are indicators of saturated or inundated conditions sufficient to support a predominance of wetland indicator plants, a predominance of wetland indicator plants, or credible evidence from a competent source that the area supported or would support under undisturbed conditions a predominance of wetland indicator plants prior to the disturbance.

    Small wetlands, variable wetland situations, and the specific boundary to any wetland must be determined in the field.

C. Field Procedure

1. Preparation

Prior to doing the field work, appropriate field maps will be consulted to determine the general location of sensitive areas on the railroad ROW.

2. Boundary Establishment

The sensitive area boundaries, which are not readily identifiable in the field, will be established for these areas. All boundaries use minimum setback distances specified in the regulations. Boundaries are marked on the tracks using color coded plates screwed to the ties, color coded paint applied to the base of rails and ties, or color-coded posts adjacent to the track. Boundary markers are placed on the track at a point where the sensitive area intersects with the track plus the required setback distance. In most locations, the boundary marker was placed as much as 15 feet beyond the minimum to find the best, strongest, and most visible location for the marker.

The occurrence of standing water in manmade drainage ditches will not be used as a principal indication of wetlands. The four major indications are vegetation, topography, soils, and hydrology. (Hydrology of a site relates to the distribution and circulation of water on the surface and in the soil). Vegetation and signs of obvious hydrology will be used to determine wetland boundaries according to the DEP Wetland Protection Act Regulations. Soils are helpful in verifying wetland boundaries but will not be used as a determining factor in typical situations. Vegetation responds quickly to changes in soil moisture and drainage. Plants are more likely to indicate newly forming wetlands, or wetlands that are in the process of enlarging. Soils are useful as indications of long-term hydrologic conditions. They are especially useful for disturbed sites and drier wetlands lacking typical wetland plants.

Topographic depressions where water collects, or where the water table is close to the surface, usually allow the development of wetlands. The boundary of a wetland in a low, flat area surrounded by hilly terrain often corresponds to the "break" in the slope, or the point at which the land begins to flatten.

Once the boundary of a wetland has been established distances will be measured to establish appropriate no-spray and buffer zones. Permanent boundary markers will be installed along the ROW and color coded to indicate the proper spray status of the area to the herbicide applicator.

3. Approval of Findings

The Conservation Commission of each municipality is given the opportunity to observe and inspect the wetland boundary markers. A request for a determination of applicability was filed with each Conservation Commission pursuant to the Wetland Protection Act regulations, 310 CMR 10.05 (3) a.2. Form 1 was accompanied by a map of the ROW indicating the location of the boundary markers

on the track and type of delineation that was made. These determinations are effective for the duration of the VMP as specified in 310 CMR 10.05 (3)(b)(1).

Data relating to the following is submitted to the Conservation Commission in each town as part of the Yearly Operational Plan.

a. Maps, or updates thereof, locating the ROW and sensitive areas not readily identifiable in the field.
b. Herbicides proposed including application rates, carriers, adjuvants.
c. Herbicide application techniques and alternative control procedures proposed.
d. The company which will perform any herbicide treatment.
e. Identification of target vegetation
f. Individual representing applicant supervising YOP.
g. Flagging methods to designate sensitive areas on the ROW.
h. Herbicide Fact Sheets as approved by the Department of Agricultural Resource (MDAR)
i. Procedures and locations for handling, mixing, and loading of herbicide concentrates.

D. Operational Strategies and Procedures Vegetation control procedures within the railroad ROW will be made consistent with all state and Federal regulations. The general vegetation control strategies will exclude the use of herbicides in any application that would result in drift to:

a. any Zone I;
b. 100 feet of any Class A Surface Water Source;
c. 100 feet of any tributary or associated surface water body where the tributary or associated surface water body runs within 400 feet of a Class A surface water source;
d. 10 feet of any tributary or associated surface water body where the tributary or associated surface water body is at a distance greater than 400 feet from a Class A surface water source;
e. a lateral distance of 100 feet for 400 feet upstream, on both sides of the river, of a Class B Drinking Water Intake;
f. 50 feet of any identified Private Well; 10 feet of any Wetlands or Water Over Wetlands;
g. 10 feet of the mean annual high-water line of any river; and
h. 10 feet of any Certified Vernal Pool.

On the railroad roadbed, currently, there is no suitable alternative to herbicide vegetation control. However, on areas adjacent to the right-of-way where brush is too tall to treat, mechanical methods will be employed as the initial treatment. Following mechanical vegetation control, herbicide treatments may be used to manage re-growth of target vegetation. The choice of herbicide and application method will depend on the type and density of the target vegetation. In areas adjacent to the shoulder where selective growth of herbaceous and low-growing woody plants is desired, selective cutting, including stump treatment, will be utilized as needed.

Compliance with all notification procedures mandated by State regulations will be strictly followed. Several days before scheduled maintenance activities, a railroad track inspector or another knowledgeable individual familiar with the boundary marking system, equipped with boundary maps and/or log sheets, will assess the designated treatment area to ensure the visibility and placement of all boundary markers.

During herbicide application on the ROW, all herbicide applicators will be accompanied by a railroad representative. The vegetation management crew will possess the necessary maps of the ROW and other required documents and will be trained to identify and observe the boundary markers and areas that may not be readily identifiable in the field.

IX. OPERATIONAL GUIDELINES FOR APPLICATORS RELATIVE TO HERBICIDE USE

1. GUIDELINES FOR SENSITIVE AREAS

Site Review
A thorough review of vegetation conditions will be conducted on sites identified as needing vegetation control. This review will be carried out by a track inspector or another experienced individual in vegetation management. For edge areas adjacent to the shoulder, the need for control and the required treatment will be assessed. The density and type of target species present in each area will be documented to develop an effective control strategy.

Office Procedures
All available information will be analyzed using the following process. Areas scheduled for construction or other activities that will eliminate the need for vegetation maintenance at that time will be identified. If vegetation on these areas will be controlled or removed, they will be excluded from further consideration in the program being developed. Next, the identified sensitive areas will be reviewed to ensure appropriate measures have been taken to protect them. The treatment methods prescribed for each sensitive area buffer zone will be reviewed, and whenever feasible, mechanical methods or more selective herbicide applications will be recommended. No-spray areas will be assessed based on the overall vegetation conditions, and mechanical methods will be employed to selectively remove or side trim trees encroaching on the roadbed area. Ongoing evaluation will be conducted to determine if suitable alternatives to herbicide applications have been developed for use in sensitive areas on the roadbed.

This analysis will provide site-specific information necessary for the development of the Yearly Operational Plan (YOP). The YOP will be formulated and submitted to MDAR for approval in accordance with 333 CMR 11.06(1).

2. PREPARATION FOR HERBICIDE APPLICATION

At least 21 days prior to the scheduled application date, proper notice will be given to the Department of Agricultural Resources, Conservation Commission, Board of Health, Mayor, and local public water suppliers in each community, as required by Massachusetts State regulations.

Before the scheduled application date, qualified personnel will survey the treatment area with the sensitive area maps to ensure all boundary markers are present and visible.

Basic Requirements
To safeguard public welfare and prevent adverse impacts on the environment, railroad herbicide application crews must include an applicator who is licensed and certified in the Commonwealth of Massachusetts under Category 40. Additionally, there must be a Field Supervisor who reports daily to the railroad representative, or another qualified railroad employee assigned to this role. The railroad is responsible for ensuring compliance with this Vegetation Management Program (VMP) by its employees or contractors. Applicators must adhere to all railroad safety regulations and follow herbicide label directions.

a. Daily Field Report of Vegetation Control Activities

Operators responsible for the work will complete a daily field report of vegetation control activities. This report will include, but is not limited to:
herbicide/adjuvant mixture components and proportions, equipment used, application rate, precise locations of treated and non-treated tracks and adjacent areas, application dates, trade names of products, EPA registration numbers, applicator names, and target pests.

X. ALTERNATIVE LAND USE

Safety of passengers and railroad personnel is the key driver behind managing vegetation on a railroad right-of-way and all shared uses are subject to that requirement. Uses such as utility or telecom lines, or pipelines may work, but would not significantly change or reduce the use of herbicides, which is the intent of the alternative land use requirement. Parties interested may submit alternative land use proposals for the railroad's consideration.

XI. REMEDIAL PLAN TO ADDRESS SPILLS AND RELATED INCIDENTS

Pesticides are substances or mixtures that are defined by MDAR as having the ability to prevent, destroy, repel, mitigate pests, or regulate plants by defoliation, desiccation, or other means. This remedial plan outlines the appropriate procedures for addressing incidents involving pesticides. Since each incident can vary, applicators must consider specific factors in the situation and use their judgment to determine the suitable course of action. It's worth noting that applicators usually handle small amounts of pesticides, which limits the potential for significant accidents. Both federal and state regulations establish emergency response protocols that companies and their contractors must adhere to in case of spills or related accidents. According to the Federal Environmental Pesticide Control Act, it is the legal responsibility of the applicator to manage the cleanup of pesticide spills resulting from their product use and handling. Applicators are held accountable for damages, may face penalties, and are obligated to clean up and decontaminate areas affected by pesticide spills.

A. Handling, Mixing, and Loading

All pesticide mixing and loading tasks will be undertaken by a licensed contractor in a controlled environment, not on the jobsite, following the manufacturer's instructions. Only the necessary amount of pesticides required for the planned vegetation control work will be mixed to minimize waste and excess handling. Vehicles used for spray operations will be equipped with absorbent materials, activated charcoal, leak-proof containers, a broom, and a shovel to address minor spills. A log detailing all pesticides on the vehicle will be maintained on-site, along with pesticide labels and safety data sheets (SDS) carried by the applicator.

B. Spills and Incidents

For the purposes of this VMP (Vegetation Management Plan), major spills involve hazardous materials in quantities that require reporting, as defined by the Department of Environmental Protection (DEP) 320 CMR 40.000. Related accidents encompass incidents such as fires, poisonings, and automobile accidents. Any minor spill will be reported to the Pesticide Bureau. In situations where a spill cannot be contained or removed by the crew, major spills will be managed in a manner like minor spills. In such cases, the MassDEP Incident Response Unit and the Pesticide Bureau should be contacted. In any instance where there is a spill of a regulated quantity, regardless of its major or minor classification, MassDEP must be notified in accordance with 310 CMR 40.00 Massachusetts Contingency Plan. If a spill is observed, immediate actions will be taken to contain and safeguard the spill area, as outlined below:

1. Provide appropriate first aid and contact an ambulance or the Massachusetts Poison Information Center in poisoning cases.
2. Notify the police and/or fire department in cases involving fires or automobile accidents.

3. If feasible, halt the spill by stopping the source of the leak.
4. Constrain the spread of liquids using a barrier made of soil or other absorbent materials.
5. Seek assistance from ChemTrec, the Massachusetts Pesticide Bureau, or the chemical manufacturer (refer to Emergency Contact List below) if you're unable to manage the spill or if the substance is unfamiliar.
6. Alert MADEP if water bodies are contaminated or for releases/threatened releases of reportable hazardous materials.
7. Clean up spillage:
   a) For public locations, isolate the affected area and prevent unauthorized entry until cleanup is completed.
   b) Absorb spilled liquids using sand, absorptive clay, spill control gel, vermiculite, pet litter, sawdust, or other suitable absorbent material. Wear proper protective gear.
   c) Collect the contaminated absorbent using a leak-proof, sealable container for proper disposal.
   d) Directly place dry pesticides, such as dust, granules, and pellets, into leak-proof, sealable containers without absorbent materials.
   e) Neutralize the affected area using hydrated lime, sodium hypochlorite (bleach), or soapy water. Avoid mixing bleach and ammonia-based products to prevent the release of poisonous gas.
   f) Dispose of contaminated materials at an approved location.

Emergency Information and Points of Contact

In the event of a spill or emergency, information on safety precautions and clean up procedures may be gathered from the following sources:

- MA Department of Environmental Protection (DEP) Incident Response Unit 1-888-304-1133
- ChemTrec (800) 262-8200
- MA Poison Control Center (800) 222-1222
- MA Department of Agricultural Resources (MDAR) (617) 626-1700
  - Pesticide Program (617)626-1776
- Environmental Protection Agency Pesticide Hotline (800) 858-7378
- MA Department of Public Health, Bureau of Climate and Environmental Health, Environmental Toxicology Program (617) 624-5757
- MBTA (617) 222 3200

A copy of the YOP shall be always carried with the herbicide applicator. The YOP contains telephone numbers for the state police, local fire departments, poison control center, MBTA Safety Department, and herbicide manufacturer(s), as well as a spill response checklist and Material Safety Data Sheets (SDS).

XII. IDENTIFICATION AND QUALIFICATIONS OF INDIVIDUALS DEVELOPING THE PLAN

This plan was developed by Calvin Layton of New Salem, Massachusetts, a vegetation management consultant with over forty years of vegetation management supervision as a Massachusetts Certified Arborist and Certified Massachusetts Category 40 Pesticide Applicator, including writing three other Vegetation Management Plan's and several Yearly Operational Plans. His experience includes all aspects of utility, municipal, highway and railroad rights-of-way vegetation management, from the application of herbicides to the management and implementation of programs. He researched, developed, and implemented advanced application methods used by the MBTA. He was also a founding member of the Massachusetts Invasive Plant Advisory Group.
Contact: Calvin Layton (978) 544-7892.

Individuals supervising execution of the VMP and representing the railroad.

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XIII. DEFINITIONS

Ballast: The rock that supports the track and ties. This rock is groomed to keep the track in place, drain water away from the track and distribute the weight of trains to surrounding soil.

Centerline of Track: An imaginary line, that runs down the center of the two rails of a track.

Culvert: A structure carrying water under a railroad that is designed to support the live load of railway traffic and dead load of the soil and track structure above. The live load becomes less of a factor as the depth of cover above the culvert increases, due to distribution of the live load through the soil. Bridges do not generally have an overburden of soil above the spanning elements.

Rail properties: Infrastructure within the "Rail ROW" that has a demonstrable relationship to the function and operation of a railroad or rail transit system, including but not limited to: rails and tracks, ties, ballast, rail beds, signal and communication systems, switches, overhead catenary systems, signage, traction power substations, passenger stations/depots and associated infrastructure and utilities, freight transfer facilities, boarding areas and platforms, boarding platform shelters and canopies, bridges, culverts, tunnels, ancillary facilities, ventilation structures, equipment maintenance and storage facilities, railyards, parking lots and structures, landscaping, passenger walkways, and security and safety fencing.

Rights-of-way: Land that the Railroad owns or owns an interest in that contains facilities for train operations. The Railroad and Rail Transit Rights-of-Way ("Rail ROW") includes the land and infrastructure that have been developed for existing or former intercity passenger rail, freight rail, rail transit operations, or that are maintained for the purpose of such operations. Rail ROW includes current and or former railroad or rail transit lines regardless of current ownership and whether there is rail service operation on the rail line. It includes property that was previously developed for railroad or rail transit use even though the infrastructure has been modified or removed, and the property may lack visual evidence of previous railroad or rail transit use. It does not include land that was never developed for railroad or rail transit use. Rail ROW includes and may be identifiable by the presence of infrastructure that has a demonstrable relationship to the past or current function and operation of a railroad or rail transit system that commonly includes but is not limited to the rail properties [3].

[3] Source: Federal Register Vol. 84 No 125, ACHP Sec V (H)

Roadbed: The graded area beneath and on either side of the track.

Foul the Ballast: Anything that contaminates the ballast section of the roadbed and inhibits the ballast from supporting the track, draining water, or suppressing weed growth.

Foul the Track: Any obstruction that renders the track system unsafe for train passage.

Signal: A Railroad facility used to inform Railroad personnel of track conditions.

Splice: A point in the fiber optic system running line where cables are fused together to create a continuous system. Spur Track: A secondary track designed to allow access to industries along the main track.

Switch: A moveable track device that allows trains to transfer from one track to another, encompassing the distance from the point of switch to the point of frog.

Tracks: The rails, ties and ballast and roadbed that compose the traveling surface used by trains.

Track Structure: The rails, ties, ballast, and roadbed that compose the traveling surface used by trains.

Trains: One or more engines coupled together, with or without cars that use the Railroad's tracks.

Train Movement: Any motion of engines and/or cars over the Railroad's tracks.

Trench: A narrow section of earth removed to allow installation of the fiber system.

Valuation Map: A Railroad map depicting the Railroad's facilities and engineering stationing.

Wet Bores: Are bores that use liquid to displace soil.

Yard: A collection of secondary tracks used to store equipment (cars, engines, maintenance machines, etc.), assemble or disassemble trains, and/or conduct other Railroad operations.

APPENDICES

Appendix A Municipalities Affected by this Plan.

MBTA RAPID TRANSIT SYSTEM MILES BY COMMUNITY

LINE	COMMUNITY	OUTSIDE MILES	TUNNEL MILES
GREEN (COMBINED)	BOSTON	7.68	4.64
	BROOKLINE	4.99	0.12
	CAMBRIDGE	0.65	0
	MEDFORD	0.71	0
	NEWTON	5.76	0
	SOMERVILLE	2.37	0
RED (INCLUDES MATTAPAN HSL)	BOSTON	7.22	3.83
	BRAINTREE	1.69	0
	CAMBRIDGE	0.32	4.11
	MILTON	1.3	0
	QUINCY	4.35	0
	SOMERVILLE	0	0.77
ORANGE	BOSTON	3.57	3.67
	MALDEN	1.78	0.00
	MEDFORD	1.06	0.07
	SOMERVILLE	1.03	0.00
BLUE	BOSTON	2.42	2.12
	REVERE	1.45	0
TOTAL MILES		48.35	19.33

Appendix B MBTA Rapid Transit System Map

Appendix C 333 CMR 11:00: Right of Way Management

https://www.mass.gov/regulations/333-CMR-1100-rights-of-way-management

Appendix D MBTA BMP's

MBTA BEST MANAGEMENT PRACTICES

Vegetation on rail rights-of-way (ROW) affects operations, maintenance activities and most importantly has a potential risk to the safety of passengers, employees, community and the environment. The 49 CFR 213.37 states in part, all vegetation will be removed from the following areas:

- Ballast section (chemical only)
- Ballast shoulder (chemical and or mechanical)
- Yards (chemical and or mechanical)
- Switches, signals, and signs (chemical and or mechanical)
- Highway grade crossings (chemical and or mechanical)
- Bridges, abutments & buildings (chemical and or mechanical)
- Off-track areas (chemical and or mechanical)
- Inside of curves (chemical and or mechanical)

The Vegetation Management Plan (VMP) incorporates an *Integrated Vegetation Management* (IVM) approach that includes chemical and physical/mechanical controls for the reduction of vegetation hazards along the ROW that may:

- Become a **fire hazard** to track-carrying structures;
- **Obstruct visibility** of railroad signs and signals: along the right-of-way, and highway-rail crossings;

- Prevent railroad employees from conducting federally **required inspections**
- **Interfere with railroad employees performing normal trackside duties**; and or,
- Prevent **proper functioning of power, signal and communication lines**
- Present a risk to the safe operation of trains

The Yearly Operating Plan (YOP) covers the permitted activities under the approved five-year VMP under the jurisdiction of the Massachusetts Department of Agricultural Resources (MDAR) in compliance with 333 CMR 11.00: M.G.L. c. 132B. The YOP is submitted for review and approval to MDAR at the beginning of every calendar year. The MDAR has 90 days upon receipt of the YOP to review and issue written approval. Upon receipt of the YOP, MDAR publishes a public notice in the Environmental Monitor and a 45 day public comment period begins. Concurrently, the YOP is communicated via certified mail to all communities included within the VMP. In addition, MBTA submits the previously approved maps included as part of the VMP to the National Heritage of Endangered Species Program for review.

The approved VMP and the YOPs can be found in the MDAR website. The YOP serves to inform communities on annually of activities planned for vegetation controls and may include any and or all of the following:

- Chemical(s) to be applied pre-emergent spring and post-emergent/brush in late summer and early fall
- Chemical (s) for Off-track brush control late summer and fall
- Chemicals used for stem treatment throughout the year.

- Mechanical controls throughout the year
- Roadbed drainage ditch vegetation clearing throughout the year

CHEMICAL APPLICATION:

Chemical application is required to ensure railroad **roadbed** is clear of *all* vegetation. Areas adjacent to the roadbed, will be treated as needed and following the controls specified within the VMP and the approved zone maps for each community. Every year, the Environmental Department reviews the areas and conditions based on MBTA Engineering Department inspections, previous YOPs and areas of significant concern for prioritization of target vegetation for chemical application or mechanical controls. MBTA employs strategies for *selective application* of herbicides focusing on the methodology of spray to control target vegetation. In doing so, we reduce the application to non-target vegetation and protect the environment.

In addition, and to further reduce chemical application, MBTA has implemented best management practices to avoid "spray" of herbicides along the "roadbed" locations or other critical infrastructure along the ROW requiring full removal of vegetation, where:

(1) Rail Tie replacement has been conducted within a period of 24 months.

(2) Major construction requiring disturbance of ballast and or replacement of ballast has been completed within a period of 12 months

Chemical application is planned according to the maps by line. In addition, MBTA only utilizes chemicals included within the approved MDAR ROW Sensitive Areas Material List.

Further, MBTA employs only certified/licensed applicators. The application of herbicide follows a review process that incorporates planning for reduction of herbicide application. This is done with the support of a MBTA trained Environmental Monitor who follows the maps and guides contractor to employ best management practices and monitor real time conditions. The herbicide is not applied:

- Near people
- Near animals / livestock
- Near agricultural areas
- Onto active train platforms nor over nonrailroad fences
- Onto nonrailroad property
- Nonrailroad structures (Sheds, Tarps, garages, playgrounds, firewood piles, etc.)
- Landscaped areas
- Well-kept shrubs
- Branches of trees above 12 feet in height except for side trimming
- If the following is observed in the field: free standing or moving water, wetland vegetation, people, animals,

  nonrailroad property, ground water supply areas, public/private wells.

- Near active, or soon to be active work areas.

  Personnel applying herbicide are required to maintain daily records of application. Further, MBTA requires applicators to incorporate BMPs and the following:

- Drift control product to produce larger droplets to control drift to non-target areas.
- Monitor weather and wind speed direction to avoid drift of herbicide to non-designated areas (Nonrailroad

  property, sensitive areas, water, etc.)

- Weather conditions that may adversely affect the effectiveness of the herbicide. No application will be done

  during rain and or after heavy rain events. Dry conditions provide a more effective treatment of areas.

- Applicator will maintain a daily log to document conditions at the start/end of chemical application.

PHYSICAL AND MECHANICAL CONTROLS:

MBTA employs third party professional arborists and certified special services to conduct tree clearing activities. MBTA Engineering Department staff conduct general brush cutting and manual vegetation clearing as needed.

MBTA environmental and engineering staff and contractors review video and GIS tools to assess key critical areas to target annually. MBTA best management practices for physical/mechanical methods include:

Evaluation of statistical/historical conditions for target areas (derailments, slippery rail, incidents, inspections, etc.) to determine target vegetation.
Survey - lines via hi-rail with contractor and MBTA engineers reviewing work with GPS-enabled video cameras

Drone use for evaluation of canopy over ROW
Evaluation of sensitive areas utilizing Mass GIS
Evaluate VMP maps and identified No-Spray and Limited Spray Zones.

Superintendents work in advance of crews to best determine property lines and assess tree characteristics and mitigation methods using GIS applications, physical markers, fences and Val maps to aid in property boundary determinations.

Contractor Arborists utilize tree hazards assessment techniques to target hazardous conditions and defected trees (ANSI A-300) standards, and invasive species identification.

Regular track inspections to identify emerging hazards Methods- mechanical cutting & trimming Selective Vegetation Approach

- Tree cutting/removal is prescribed where trimming approach is insufficient or impracticable focusing on the safety and operational needs to ensure compliance with 40 CFR 237.
- Preference for trimming will be considered for sensitive resource areas when practicable.
- Tree work is performed utilizing aerial lifts and specialized tree equipment fitted with hi-rail gear for rail travel to avoid disturbance of sensitive resource areas. No land disturbance will be conducted while performing vegetation controls.
- Tree stumps are left at approximately between 6 to 12 inches to avoid soil disturbance.
- All chainsaws utilize environmentally-friendly biodegradable bar and chain oil.
- Debris generated is either transported to an off-site location for a variety of recycling purposes, or it’s chipped on site.
- Chips are broadcast within MBTA property limits on the shoulders of the corridor a minimum of 25ft. from resource areas.
- Chippings will not be stockpiled more than 12 inches and whenever practicable they will be spread along ROW.
- Chippings need to be spread away from tracks and drainage ditches