CONNECTICUT AIRPORT AUTHORITY

BRADLEY INTERNATIONAL AIRPORT – TAXIWAY E RECONSTRUCTION PROJECT

WINDSOR LOCKS, CT

DRAFT ENVIRONMENTAL ASSESSMENT

McFarland Johnson

FAA A.I.P. 3-09-0022-XXX-2021
CAA CONTRACT NO. 2021-006

MARCH 2021

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Prepared for:

CAA
CONNECTICUT AIRPORT AUTHORITY

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This Environmental Assessment becomes a Federal document when evaluated and signed by the responsible FAA Official.

_____	_____	_____
(Print Name)	*(Signature)*	*(Date)*

MARCH 2021

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1. INTRODUCTION

This Environmental Assessment (EA) addresses the potential social, economic, and environmental consequences associated with the proposed Taxiway (TW) E construction project at Bradley International Airport (the Airport), airport identifier BDL, located in Windsor Locks, Connecticut. The TW E project involves airfield improvements and taxiway reconfigurations.

Based upon the findings in previous studies/reports conducted for the Airport, the proposed improvements are required by the Federal Aviation Administration (FAA) in order to meet FAA standards, reduce confusion on the airfield by removing abandoned pavement associated with the decommissioned Runway 1-19, and improve safety by constructing and reconfiguring/relocating TW E to be within the decommissioned Runway 1-19 pavement. The reconfiguration of TW E will provide a more direct taxiway routing configuration from the mid-point of the terminal ramp to the Runway 24 End. Additionally, these improvements would increase the operational flexibility and efficiency of the Airport. The study on which these proposed improvements is based upon includes:

- Airport Master Plan Update (MPU) & Airport Layout Plan (ALP) (CHA Companies, December 2018)

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969; the Council on Environmental Quality (CEQ) regulations stated in 40 Code of Federal Regulations (CFR) Parts 1500-1508, the FAA "1050.1F Desk Reference" dated February 2020, FAA Order 5050.4B, "National Environmental Policy Act (NEPA) Implementing Instruction for Airport Projects", and FAA Order 1050.1F, "Environmental Impacts: Policies and Procedures."

If the potential impacts identified herein do not appear to be adverse or are such that they can be mitigated to a level below established significant impact thresholds, a Finding of No Significant Impact (FONSI) may be issued by the FAA. An Environmental Impact Statement would be required when one or more environmental impacts of a Proposed Action would be significant and mitigation measures would not reduce the impact(s) below significant levels.

1.1. BRADLEY INTERNATIONAL AIRPORT BACKGROUND AND LOCATION

The Airport is located in northern Connecticut about halfway between Hartford, Connecticut (approximately 12 miles to the south) and Springfield, Massachusetts (approximately 16 miles to the north). The Airport is situated on approximately 2,400 acres located in the towns of Windsor Locks, Windsor, Suffield, and East Granby, in Hartford County, Connecticut (**Figure 1**). The Airport is owned and operated by the Connecticut Airport Authority (CAA), a quasi-public agency established in July 2011 to develop, improve, and operate BDL and the state's five additional general aviation airports. Operations at the Airport include both public/commercial and military use.

Airside facilities include two active use runways and one decommissioned runway. Runway 6-24 is considered the primary runway and is approximately 9,510 feet long by 200 feet wide. The crosswind runway, Runway 15-33, is approximately 6,847 feet long by 150 feet wide. Runway 1-19 has been

decommissioned (i.e., is no longer used as a runway and currently abandoned pavement) and is approximately 4,269 feet long by 100 feet wide. Additional airside facilities include associated lighting and navigational aids, parallel taxiways, and apron areas. Landside facilities include the passenger terminal facilities, parking areas, and roadways.

1.2. DESCRIPTION OF PROPOSED ACTION

The proposed project, hereafter referred to as the Proposed Action, consists of the following elements, which are necessary to meet the overall purpose of improving safety at the Airport:

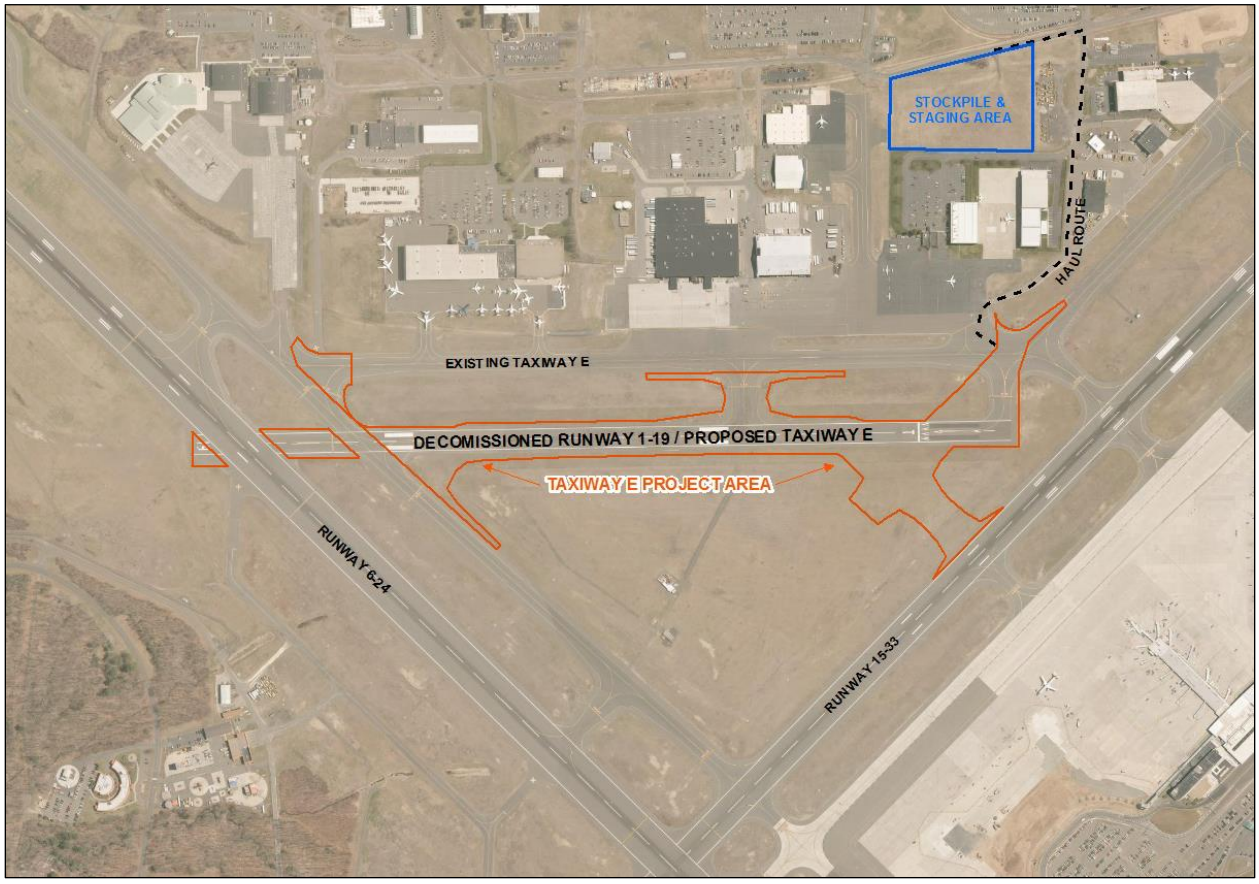
Reconfigure and Reconstruct Taxiway E

The project includes shifting TW E to the west partially within the existing footprint of decommissioned Runway (RW) 1-19. Portions of the existing RW 1-19 pavement area would be reconstructed to become the new TW E. The TW E width requirement is 75 feet plus additional 30-foot paved shoulders for a total pavement width of 135 feet. The existing Runway 1-19 pavement is 100 feet wide with 20-foot-wide paved shoulders for a total width of 140 feet. The proposed TW E relocation will be centered on the existing Runway 1-19 pavement and will typically result in a smaller footprint of impervious pavement along the decommissioned runway. Relocating TW E will provide substantial additional space between the Taxiway and the adjacent facilities operated by Bombardier, UPS, and TAC Air. The existing TW E pavement would be converted to a taxi-lane (taxi-lane N) serving these existing facilities/tenants and would enable future apron expansions as needed and shown in the Ultimate Airport Layout Plan.

New intersection points would also be constructed at the northern and southern ends of the new TW E. In addition, the parallel TW T along RW 15-33 will be extended to establish a new intersection with the reconfigured TW E which will allow for further extension of TW T in the future in accordance with the current Ultimate Airport Layout Plan. Taxi-lane M will also get a new stub section that extends into the existing TW E/ new Taxi-lane N. This new stub section will eliminate a potential “hot spot” area and divert aircraft traffic exiting the TAC Air apron onto Taxi-lane N prior to entering TW T. The Proposed Action also includes new airfield layout and lighting systems, FAA communication cable systems, airfield signage, drainage improvements, and pavement markings associated with the new taxiway and other geometric modifications.

Remove abandoned decommissioned RW 1-19 pavement and existing TW C/E and E/T pavements

Approximately 7.1 acres of existing pavement would be removed from portions of decommissioned RW 1-19 and TW’s C/E and E/T. The pavement removal would accommodate the reconfiguration of the taxiway system while removing unnecessary pavement surfaces necessary for the proposed geometric layout modifications. Pavement removal areas would be restored to vegetated grassland and will mitigate for potential impacts to state listed rare species.



Proposed Project Area

Stockpile and Staging Area

The stockpile and equipment/material staging area is an approximately 6.5-acre grass lot located near Gate E-18 on Light Lane Road. This area consists of frequently mowed turfgrass and portions of this area are currently used to store snow removal equipment and other machinery. The project work areas will use a temporary gate in the existing perimeter fence and use Taxilane M shoulder pavement to access the work zones. A temporary gravel access road will be installed within the grassed portion of the staging area to better eliminate tracking during hauling operations onto the aircraft operations area and haul roads.

2. PURPOSE AND NEED

The Purpose and Need Statement in a NEPA document is a formal statement of the overall problems to be addressed and justification of a Proposed Action. The statement documents the justification for the project and provides the basis for evaluating the effectiveness of alternatives.

2.1. PURPOSE

The purpose of the Proposed Action is to improve airfield operational efficiency and safety by complying with federal regulations and current FAA taxiway design standards.

2.2. NEED

The Master Plan Update (MPU) completed in 2018 determined the Taxiway E realignment is needed to address existing and future shortcomings of the taxiway facilities. Shortcomings include:

- The entrance from the TAC Air apron to TW E lacks clear entry and exit lanes, creating the potential for conflicts between aircraft using the same pavement while entering/exiting the apron area and taxiway.
- At the TW T/E intersection there is a direct access situation, which is where aircraft may directly access a runway without making a turn. This configuration makes it more likely aircraft may unintentionally enter a runway, resulting in possible conflicts with aircraft using the runway.
- The centerline of the existing TW E and edge of ramp pavement (Taxiway Object Free Area) are closer than desired, making it possible for aircraft on the taxiway and ramp to come into contact. There is also insufficient space for future apron expansion with the existing configuration.
- Taxiway C/E and Taxiway E/T have acute angle intersections, which limit the ability of pilots approaching an intersection to see other aircraft on a taxiway or runway. The FAA recommends right-angle intersections because it improves visibility. The TW E reconstruction/reconfiguration project is needed to improve visibility and increase safety at the Airport.

3. ALTERNATIVES

The following is a summary of the alternatives considered during the evaluation process to select the Proposed Action at BDL. The Proposed Action was selected based upon the evaluation of alternatives for each of the major project elements. The analysis is based on the 2018 Master Plan Update (MPU). Alternatives, including the no build alternative, were evaluated for each of the proposed project elements in accordance with the criteria described below.

For purposes of this EA, the alternatives were progressed at equivalent design levels to provide a fair comparison of economic, social, and environmental consequences. Only one build alternative satisfies the project purpose and need, therefore one build and the no-build alternatives were considered. The following is a summary of the alternatives developed for the project elements. Each of the alternatives was evaluated in accordance with the criteria described below.

3.1. ALTERNATIVES EVALUATION CRITERIA

Criteria considered in the development and evaluations of the alternatives are listed below. The feasibility of each of the alternatives was evaluated based upon how well they would meet these criteria, as described below.

- **FAA Design Standards:** Does the alternative address the design deficiencies described in the purpose and need statement, based on the Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5300-13A, Airport Design, and Code of Federal Regulations (CFR) Part 77, Objects Affecting Navigable Airspace, to the maximum extent feasible?

- **Facility Requirements:** Does the alternative meet the existing and future operational needs of the Airport and is the alternative feasible for implementation?

- **Environmental Impact:** What are the potential environmental impacts associated with implementation of the alternative? To what extent does the alternative further achievement of the Airport's environmental goals?

- **Development Costs:** Does the alternative have reasonable development costs in comparison to other alternatives that achieve the same goal?

- **Operational Flexibility:** Does the alternative allow flexibility from an operational standpoint?

3.2. TAXIWAY E RECONFIGURATION ALTERNATIVES

3.2.1. No-Build Alternative

The No-Build Alternative offers no changes to the existing layout at BDL.

The Taxiway E No-Build Alternative was assessed against five evaluation factors; the results are below:

- **FAA Design Standards:** The No-Build Alternative does not address the FAA standards related to the taxiway realignment.

- **Facility Requirements:** The No-Build Alternative would not address existing and future shortcomings of the taxiway facilities which can lead to congestion at airport Hot Spots and safety concerns.

- **Environmental Impact:** The No-Build Alternative does not involve any ground disturbance. Therefore, no environmental impacts are expected.

- **Developmental Costs:** This alternative would have no costs associated since no action would be taken.

- **Operational Flexibility:** This alternative does not improve operational flexibility as it does not alter the existing layout of the Airport.

3.2.2. Build Alternative: Taxiway E Reconfiguration (Preferred)

The Build Alternative proposes to relocate and reconfigure Taxiway E.

The Taxiway E Relocation Alternative was assessed against five evaluation factors; the results are below:

- **FAA Standards:** The Taxiway E reconfiguration would provide right angle intersections at Taxiway C/E and Taxiway E/T. The Proposed Action would improve safety and meet the project need by reconfiguring the existing acute angle intersections at the above locations.

- **Facility Requirements:** The Taxiway E reconfiguration addresses existing and future shortcomings of the taxiway facilities which can lead to congestion at airport Hot Spots and safety concerns. The Build Alternative also provides additional space for future apron expansion for airport facilities and tenants.

- **Environmental Impact:** The Proposed Action would result in approximately 5.69 acres of new taxiway pavement surfaces (within existing grassland) and 3.54 acres of temporary ground disturbance (within existing grassland) associated with construction of the proposed project and required grading. The Proposed Action would also remove approximately 6.21 acres of existing pavement and restore these areas to grassland. Overall, the Proposed Action would result in a net reduction of approximately 0.52 acres of impervious pavement surfaces. There are no jurisdictional wetlands or surface waters proximal to the project area. Impacts are located entirely on Airport property. The Connecticut Department of Energy and Environmental Protection Natural Diversity Database (NDDB) has identified documented occurrences of state listed rare species on Airport property and in the vicinity of the Proposed Action. Sand barren critical habitat has also been identified on the Airfield in the vicinity of the Proposed Action. Impacts on state listed rare species and critical habitats as well as proposed mitigation measures are discussed in Chapters 4 and 5 of this EA. Section 106 consultation was completed, and the Connecticut State Historic Preservation Office (SHPO) has determined that no historic properties would be affected by the Proposed Action.

- **Developmental Costs:** The preliminary cost estimate for the Taxiway E project is $17,400,000.

- **Operational Flexibility:** The Taxiway E alternative improves operational flexibility by reducing taxi times and distances, reducing congestion, and providing improved hold locations.

3.3. ALTERNATIVES SUMMARY AND CONCLUSION

The Build Alternative fulfills the purpose and need, meets FAA standards, satisfies the airport facility requirements, and improves operational flexibility of the airport. Based on this analysis, the Build Alternative is the preferred alternative.

4. AFFECTED ENVIRONMENTAL AND ENVIRONMENTAL CONSEQUENCES

There are 14 environmental impact categories identified by FAA Order 1050.1F. Per direction provided in FAA Guidance Memo #2, 2011, "Guidance on Preparing Focused, Concise and Timely Environmental Assessments", it is not the intent of this document to provide detailed discussion or analysis of all categories. Only those areas where there is the potential for significant environmental impact caused by the Proposed Action, or where there are uncertainties which require evaluation, are identified in this document. This section provides a description of environmental conditions within the geographic area that may be affected by the Proposed Action. Information pertaining to the affected environment was obtained through on-site investigations, a review of published information, agency correspondence, and discussions with Airport personnel and public officials.

Implementation of the Proposed Action would have minimal or negligible effects on the human and/or natural environment. Efforts have been made to minimize those impacts to the maximum extent practicable. The entire project area is located on Airport property on lands designated for aviation use. There are limited environmental resources in the vicinity of the Proposed Action. Therefore, for the following potential environmental resources/impact categories, further analysis is not required because the resource is not present within the project area or the No Action or Proposed Action would not affect it:

- Air Quality
- Climate
- Coastal Resources
- Department of Transportation Act, Section 4(f)
- Farmlands
- Hazardous Materials, Solid Waste, and Pollution Prevention
- Historic, Architectural, Archaeological and Cultural Resources
- Land use
- Natural Resources and Energy Supply
- Noise and Compatible Land Use
- Socioeconomic, Environmental Justice, and Children's Environmental Health and Safety/Public Health and Safety
- Visual Effects and Light Emissions
- Water Resources (Including Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers)

The project area identified for review in the analysis described below includes the areas identified as shown on **Figure 2**. The Proposed Action was reviewed by the Connecticut State Historic Preservation Office (SHPO) to satisfy Section 1006 Requirements. The CT SHPO determined that no historic properties would be affected by the Proposed Action (**Appendix A**).

The Proposed Action, as defined in Section 3, could potentially affect the following environmental categories:

4.1. BIOLOGICAL RESOURCES

Biological resources refer to the various types of flora (plants) and fauna (mammals, birds, fish, reptiles, amphibians, insects, etc.), including state and federally listed threatened and endangered species, in a particular area. It also encompasses the habitats supporting the various flora and fauna including rivers, lakes, wetlands, forests, and other ecological communities.

4.1.1. Ecological Communities

Most of the Airport and surrounding areas have been significantly disturbed by prior airport construction, industrial/commercial development, residential development, agricultural activities, and existing transportation infrastructure. The habitat in the vicinity of the Proposed Action consists of maintained grassland with a network of paved airfield surfaces. The Connecticut Department of Energy and Environmental Protection (CT DEEP) has identified Sand Barren Critical Habitat on the airfield (**Figure 3**). Sand Barren habitat consists of dry sandy deposits with woody or grassy vegetation maintained (under natural conditions) by fire. Subtypes include sparsely vegetated sand, sandplain grassland, pitch pine scrub, riverine dredge spoils, and other/unique habitat. The subtype found on the airfield consists of sandplain grassland, and while the vegetation is no longer maintained by fire, airport maintenance activities (mowing) help to artificially maintain the sandplain grassland habitat. Further information regarding flora and fauna species associated with these ecological communities is presented in Section 4.1.2.

The Proposed Action will result in approximately 4.3 acres of impact to NDDB mapped Sand Barren Critical Habitat. Impacts are associated with the required taxiway grading and construction of the new TW E/T intersection. The Proposed Action will result in an additional 5.69 acres of new pavement within existing grassland areas (not all new pavement is located withing Sand Barren Critical Habitat). However, the Proposed Action also includes the removal of 6.21 acres of existing impervious pavement surfaces. Therefore, the overall project will result in an approximately 0.52-acre reduction in impervious pavement surfaces. Areas of pavement removal will be restored to grassland following the mitigation approach outlined in Chapter 5. Ultimately, the Proposed Action will result in an additional 0.52 acres of grassland on the airfield.

4.1.2. Flora and Fauna

The habitat in the vicinity of the Proposed Action consists of a mix of warm-season and cool-season grassland. Common and dominant species in the warm season grassland areas include: little bluestem (*Schizachyrium scoparium*), blue curl (*Trichosterna dichotomum*), orange grass (*Hypericum gentianoides*), tufted hair-sedge (*Bulbostis capalaris*), frostweeds (*Crocanthemum spp.*), yellow wild indigo (*Baptisia tinctoria*), sand sedge (*Cyperus filiculmis*), dewberry (*Rubus flagellaris*), birds foot violet (*Viola pedata*), sand violet (*Viola sagittata*), bladder campion (*Silene vulgaris*), jointweed (*Polygonella articulata*), buttonweed (*Diodia teres*), sweet everlasting (*Gnaphalium obtusifolium*), lichen (*Cladonia rangiferina*), hair capped moss (*Polytrichum sp.*), bracted plantain (*Plantago aristate*), rabbits foot clover (*Trifolium arvene*), red top (*Agrostis gigantea*), asters (*Symphotrichum spp.*) and goldenrods (*Solidago spp.*). A few shrub species are present including a few short-cropped (from mowing activities) scrub oaks (*Quercus ilicifolia*), lowbush blueberry (*Vaccinium angustifolium*) and juniper (*Juniperus communis*). Common and dominant species in the cool-season grassland include fescues (*Festuca spp.*), red top, English plantain (*Plantago lanceolata*), red clover (*Trifolium pratense*), white clover (*T. repens*), rabbits foot clover, ragweed (*Ambrosia artemisiifolia*), deer tongue grass (*Dichanthenium clandestum*), crabgrass (*Digitaria sanguinalis*), cinquefoil (*Potentilla spp.*), wood sorrel (*Oxalis spp.*), fleabane (*Erigeron spp.*), spotted knapweed (*Centaurea maculosa*), asters, horseweed (*Conyza spp.*), yarrow (*Achillea millefolium*), spurge (*Euphorbia spp.*) and bladder campion. There are transition zones on the airfield where the warm-season and cool-season grasslands overlap and species from both communities coexist.

The use of the active airfield as wildlife habitat is discouraged due to the safety concerns associated with wildlife and plane interactions. The existing perimeter fence encompasses the airfield and is designed to provide safety and security by preventing unauthorized trespassing/access, as well as deterring wildlife from entering the active airfield and becoming a safety hazard to aircraft and the general public. Wildlife found on the airfield in the vicinity of the proposed action consists of primarily birds, small mammals, and insects.

Further information on potential rare, threatened, and endangered species is provided in the following sub-section.

4.1.3. State and Federal Listed Threatened and Endangered Species

The U.S. Endangered Species Act (ESA) directs all federal agencies to work to conserve endangered and threatened species and to use their authorities to further the purposes of the ESA. Section 7 of the ESA, titled “Interagency Cooperation,” is the mechanism by which federal agencies ensure the actions they take, including those they fund or authorize, do not jeopardize the existence of any listed species. Endangered species are those which are in danger of extinction throughout their range or a significant portion of its range. Threatened species are those which are likely to become endangered within the foreseeable future throughout all or a significant portion of their range. Candidate species are species for which the United States Fish and Wildlife Service (USFWS) has sufficient information on the biological vulnerability and threats to support issuance of a proposal list, but issuance of a proposed rule is currently precluded by higher priority listing actions. Candidate species do not receive substantive or procedural

protection under the ESA. However, USFWS does encourage federal agencies and other appropriate parties to consider these species in the planning process.

The Connecticut Endangered Species Act, passed in 1989, protects state listed endangered species, threatened species, and species of special concern. The Connecticut Department of Energy and Environmental Protection (CT DEEP) administers and enforces the State's Endangered Species Act through the Natural Diversity Database (NDDB) program.

Consultations with the USFWS and NDDB were initiated to determine the existence of any documented federal or state-listed threatened or endangered species in the vicinity of the Airport.

The latest NDDB mapping was reviewed, and the majority of the Airport property is located within NDDB Area polygons #16484 and #16353. The Proposed Action is located almost entirely within NDDB Area #16484, with the exception of the southeastern corner in the vicinity of the TW E/T intersection, and the stockpile and staging area. A request for NDDB State Listed Species Review was submitted on December 3, 2020, however as of March 5, 2021 a response has not been received. Based on prior coordination with NDDB for previous projects at BDL, the NDDB program has identified the species included in **Table 1** as documented on, or potentially occurring in the vicinity of Airport Property:

Table 1. State Listed Species Identified by NDDB as Potentially Occurring in the Vicinity of BDL

TYPE	COMMON NAME	SCIENTIFIC NAME	CT LISTING STATUS
Beetle	Bombardier Beetle	*Brachinus cyanipennis*	Species of Special Concern
Beetle	Big Sand Tiger Beetle	*Cicindela formosa generosa*	Species of Special Concern
Beetle	Ground Beetle	*Harpalus erraticus*	Species of Special Concern
Dragonfly	American Rubyspot	*Hetaerina americana*	State Threatened
Moth	Scrub Euchlaena	*Euchlaena madusaria*	State Threatened
Moth	Brown-bordered geometer	*Eumacaria latiferrugata*	State Threatened
Moth	Violet Dart Moth	*Euxoa violaris*	Species of Special Concern
Moth	Phyllira Tiger Moth	*Grammia phyllira*	State Endangered
Moth	Spinose Flower Moth	*Schinia spinosae*	Species of Special Concern
Moth	Pine Barrens Zanclognatha	*Zanclognatha martha*	State Threatened
Plant	Davis' Sedge	*Carex davisii*	State Threatened
Plant	Low frostweed	*Crocanthemum propinquum*	Species of Special Concern
Bird	Grasshopper Sparrow	*Ammodramus savannarum*	State Endangered
Bird	Upland Sandpiper	*Bartramia longicauda*	State Endangered
Bird	Bobolink	*Dolichonyx oryzivorus*	Species of Special Concern
Bird	Horned Lark	*Eremophila alpestris*	State Endangered
Bird	American Kestrel	*Falco sparverius*	Species of Special Concern
Bird	Savannah Sparrow	*Passerculus sandwichensis*	Species of Special Concern
Bird	Vesper Sparrow	*Passerculus sandwichensis*	State Endangered
Bird	Eastern Meadowlark	*Sturnella magna*	State Threatened
Bird	Brown Thrasher	*Toxostoma rufum*	Species of Special Concern
Reptile	Eastern Box Turtle	*Terrapene carolina carolina*	Species of Special Concern
Reptile	Eastern Hognose Snake	*Heterodon platirhinos*	Species of Special Concern
Reptile	Spotted Turtle	*Clemmys guttata*	Species of Special Concern

An Official Species List from the USFWS was generated on December 31, 2020 (**Appendix B**). The Official Species List did not identify any federally endangered, threatened, or candidate species. The Official Species List also did not identify any designated critical habitat for any Federally listed species in the vicinity of the Proposed Action. The proposed project does not require any tree clearing activities.

Impacts to state listed rare species will be minimized and avoided to the maximum extent practicable. Rare plant surveys for low frostweed were conducted by GeoEnvironmental, Inc. (GZA) in the Summer of 2020. GZA identified populations of low frostweed in portions of the airfield in the vicinity of the TW E project, however, no verified occupied habitat or potential high-quality habitat is located within the proposed impact areas. Additional information regarding rare species and their locations and presence/absence can be found in the attached 2020 Survey Report (**Appendix C**). As mentioned above, the Proposed Action will result in a net reduction of approximately 1.42 acres of pavement surfaces. The pavement removal areas will be restored to grassland and seeded using an NDDB approved warm-season grass seed mix. Additional information on the proposed mitigation for rare species is included in Chapter 5 below.

5. MITIGATION

The proposed mitigation approach for impacts to Sand Barren Critical Habitat as well as potential impacts to state listed rare species is outlined below. Since a response specific to the Proposed Action (TW E project) has not been received from NDDB at the time of writing of this EA document, the proposed mitigation approach is based on prior coordination, recommendations, and conditions imposed on previous BDL projects of similar scope by NDDB.

5.1. RESTORATION OF GRASSLAND AREAS

Initial grading of areas that will convert grassland habitats to pavement or other graded areas will have the existing topsoil removed and stockpiled on site for re-use in the conversion of existing paved areas to grassland. The topsoil recovery will preserve some rootstock and seed stock allowing faster establishment of native warm season grassland habitats. Prior to removal of topsoil, the depth of topsoil shall be evaluated by a biologist to determine how much of the soil will be removed and stockpiled for reuse. In settings like BDL, there may be only 2-3" of soil recovery due to the sandy, thin, nature of the existing topsoil on the site. In addition, it is anticipated that additional topsoil material will need to be imported to supplement the native stockpiled topsoil material. The imported topsoil shall be mixed on site with native materials to approximate the existing consistency and organic content of the native topsoil. It is anticipated that imported loam and sand will need to be mixed on site (expected to be at a roughly 3-4:1 ratio) to approximate the texture of the existing topsoil material. Lab analysis of the existing removed topsoil will need to be completed by the successful Contractor to determine the organic content and texture of the native topsoil for a more accurate ratio of the final imported topsoil and sand mixture. Any created soils will be sourced from weed and invasive species free areas and shall be inspected by a biologist for approval prior to use. The areas of proposed grassland restoration will be prepped with native

sandy material for the base and following final pavement of the taxiway, replacement of the on-site topsoil and/or imported loam/sand topsoil mixture will occur. Following grading of the topsoil, a native warm season grassland seed mix will be applied. The proposed seed mix will be composed of at least 50 percent little bluestem.

5.2. Proposed Monitoring

In order to ensure that grassland habitat is successfully restored, two years of post-construction monitoring will occur. The post-construction monitoring will examine the status and progress of the restored grassland areas two times per growing season (June and September) following construction. At each observation, documentation on plant cover and plant species will be taken. A year-end report with site photos, as well as GIS maps of the grassland restoration area showing total plant cover, species and habitat distribution, will be provided with an assessment of the current condition and any recommendations on improvements. At the end of Year 2 post-construction monitoring, a final map showing the actual grassland habitat created will be produced to document if any or all of the restoration areas provide effective grassland habitat for the state listed species identified by NDDB and if not, what corrective actions could be employed to improve habitat.

5.3. Additional Project Conditions

In order to further protect state-listed rare species the following protection measures will be implemented over the course of the project.

- Workers will NOT be allowed to travel overland from one work area to the next. The contractor will be required to access all work areas from the closest point of pavement or concrete (i.e., non-habitat areas).
- Contractors will be notified of rare species occurrences within the work areas and given fact sheets to help them identify a potentially rare species (e.g., snakes and turtles).
- In the event that a species of conservation concern finds its way into the work area, CAA will identify, and have on retainer, a qualified biologist who has a valid collector's permit to remove and relocate the animal to a safer location outside of and away from the work area. The contact information for this person will be given to the contractors awarded the construction contract.
- Contractors will be required to observe and comply with the posted speed limits (15 mph) on all taxiways and service roads while accessing the work areas. This would help to prevent any wildlife collisions on the pavement surfaces.
- Prior to start of work, CAA will contract with a qualified biologist to have available on call to conduct a prework survey to re-locate any rare species that may be found in the potential disturbance areas, should the need arise.
- If work is conducted outside the nesting season (between September 1st and March 1st) potential adverse impacts to state-listed bird species will be minimized. However, if this time

of year restriction is not possible and work will be conducted during March, April, May, June, July or August then an ornithologist (bird expert) will be hired to conduct on-site monitoring for breeding birds within the projected work areas to determine if there is any evidence of nesting activity for the target species on the construction site or immediate buffer area adjacent to the site.

Nesting behavior would include:
Carrying of material to build nests within construction site or immediate buffer area
Carrying food or feeding young
Carrying fecal sacks from a nest
Mate feeding
Observation of nest
Observation of chicks
Copulations
Auditory evidence of chicks

If evidence of nesting is observed by the ornithologist, then all work activities must cease and the Airport must contact the NDDB for further evaluation on conservation measures to protect the nesting bird species from project activities.

5.4. CONCLUSION

Based on the mitigation approach and project conditions described above, the Proposed Action is not anticipated to have a significant impact on state listed rare species or critical habitat. The proposed project will result in a net reduction of 0.52 acres of impervious pavement surfaces which will be converted to grassland. Approximately 6.21 acres of existing pavement will be removed and restored to grassland as outlined above, in order to help mitigate and offset the 5.69 acres of new pavement proposed in existing grassland. Coordination with NDDB will continue throughout the duration of the project to ensure potential impacts are avoided and minimized to the maximum extent practicable.

6. LIST OF PREPARERS, AGENCIES, AND PERSONS CONSULTED

6.1. EA PREPARERS

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Jed Merrow, Environmental Manager, McFarland-Johnson, Inc., 53 Regional Drive, Concord, NH 03301

6.2. AGENCIES AND ORGANIZATIONS CONTACTED/CONSULTED

Federal Aviation Administration, New England Region, Airports Division (ANE-600), 12 New England Executive Park, Burlington, MA 01803. Contact: Richard Doucette, Environmental Manager (781) 238-761

Connecticut Department of Economic and Community Development, State Historic Preservation Office, 450 Columbus Boulevard, Suite 5, Hartford, CT 06103

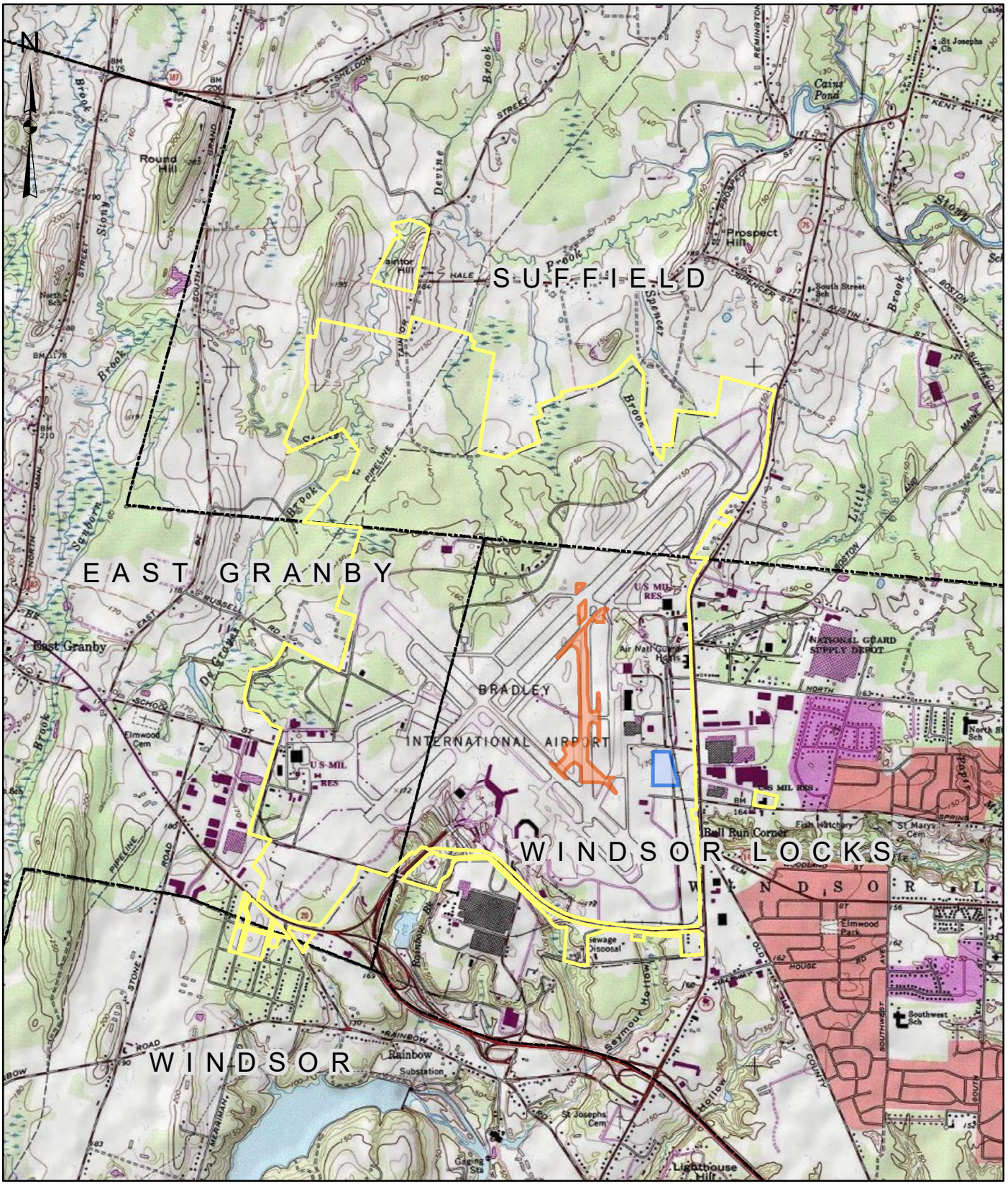
Connecticut Department of Energy and Environmental Protection, Natural Diversity Data Base Program, 79 Elm Street, Hartford, CT 06106

U.S. Fish and Wildlife Service, New England Field Office, 70 Commercial Street, Suite 300, Concord, NH 03301

The Connecticut Airport Authority, Bradley International Airport Terminal A, 3rd Floor, Administrative Offices, Windsor Locks, CT 06096

GZA GeoEnvironmental, Inc., 1350 Main Street, Suite 1400, Springfield, MA 01103. Contact: Steven Riberdy, Senior Ecologist

FIGURE 1: USGS LOCATION MAP



Airport Property Boundary

TW E Project Area

TW E Stockpile & Staging Area

Town Boundary

0 3,000 6,000

Feet

K:\CAA\T-18621.04 Construct TW E\Draw\GIS\NEPA Figures\Figure 1 - USGS Location Map - TW E.mxd

CAA TAXIWAY E CONSTRUCTION PROJECT

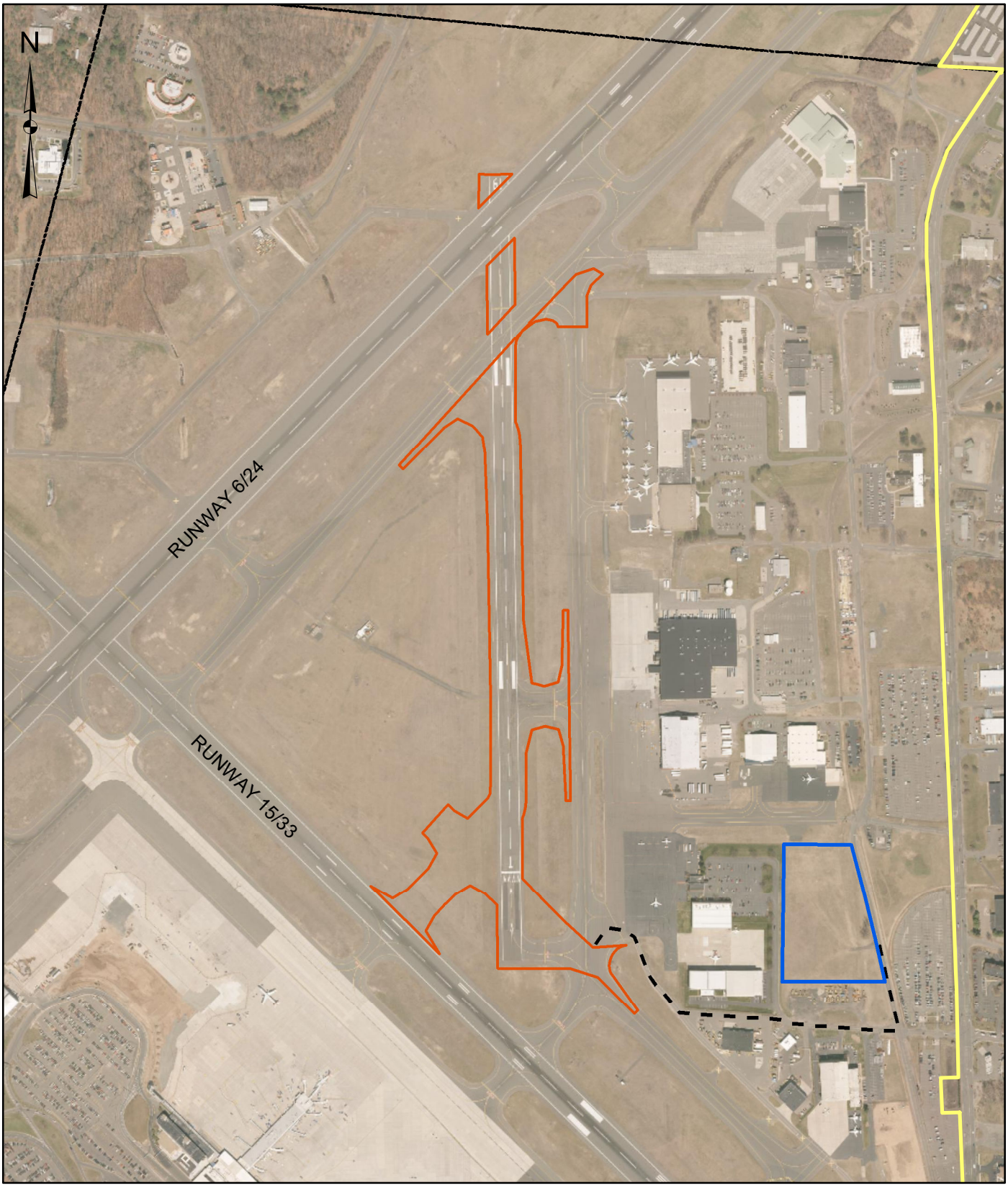
BRADLEY INTERNATIONAL AIRPORT - WINDSOR LOCKS, CT

USGS LOCATION MAP

SCALE :	DATE :	FIGURE :
1 inch = 3,000 feet	MARCH 2021	1

McFarland Johnson

FIGURE 2: PROJECT AREA



Airport Property Boundary
TW E Project Area
TW E Stockpile & Staging Area
TW E Proposed Haul Route
Town Boundary

0 750 1,500
Feet

CAA TAXIWAY E CONSTRUCTION PROJECT

BRADLEY INTERNATIONAL AIRPORT - WINDSOR LOCKS, CT

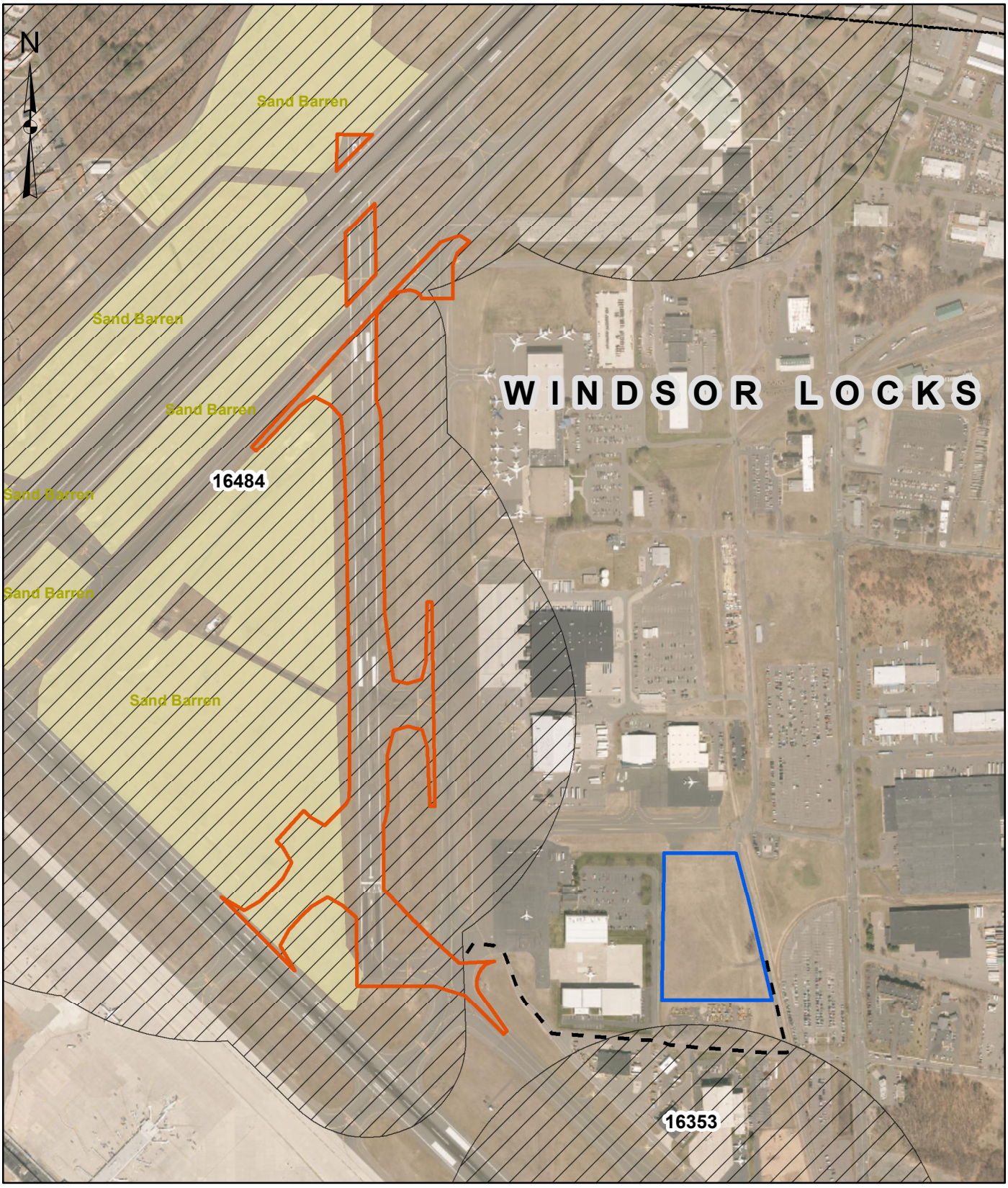
PROJECT AREA

SCALE :	DATE :	FIGURE :
1 inch = 750 feet	MARCH 2021	2

McFarland Johnson

K:\CAA\T-18621.04 Construct TW E\Draw\GIS\NEPA Figures\Figure 2 - Project Area - TW E.mxd

FIGURE 3: NDDB AREAS & CRITICAL HABITAT



TW E Project Area
TW E Stockpile & Staging Area
TW E Proposed Haul Route
Town Boundary
NDDB Areas
Critical Habitats

0 700 1,400
Feet

CAA TAXIWAY E CONSTRUCTION PROJECT
BRADLEY INTERNATIONAL AIRPORT - WINDSOR LOCKS, CT

NDDB AREAS & CRITICAL HABITAT

SCALE :	DATE :	FIGURE :
1 inch = 700 feet	MARCH 2021	3

McFarland Johnson

K:\CAA\T-18621.04 Construct TW E\Draw\GIS\NEPA Figures\Figure 3 - NDDB Areas & Critical Habitat - TW E.mxd

APPENDIX A: SHPO SECTION 106 MEMO

Connecticut®

Department of Economic and Community Development

State Historic Preservation Office

December 23, 2020

Mr. Stephen Hoffmann
McFarland-Johnson, Inc.
426 Industrial Avenue, Suite 164
Williston, VT 05403
(via email only to shoffmann@mjinc.com)

Subject: Bradley International Airport: Taxiway E Construction
Windsor Locks, Connecticut

Dear Mr. Hoffmann,

The State Historic Preservation Office (SHPO) has reviewed your request for our comments regarding the referenced project. SHPO understands that the proposed undertaking consists of constructing Taxiway E, which will require ancillary improvements and existing taxiway reconfigurations. Specifically, Taxiway E will be constructed within the footprint of decommissioned Runway 1-19; construction related access and staging will utilize existing infrastructure. The proposed activities will receive funding from the Federal Aviation Administration and require permitting from the Connecticut Department of Energy and Environmental Protection.

There are no archeological sites or properties listed in the National Register of Historic Places recorded within or in the immediate vicinity of the proposed project area. As noted in the review request, all activities will occur within previously disturbed areas. Therefore, it is unlikely that the proposed activities will impact archaeological deposits. Based on the information provided to our office, it is SHPO's opinion that no historic properties will be affected by the proposed undertaking.

SHPO appreciates the opportunity to review and comment upon this project. These comments are provided in accordance with Section 106 of the National Historic Preservation Act, as amended. For additional information, please contact Catherine Labadia, Staff Archeologist, at (860) 256-2764 or catherine.labadia@ct.gov.

Sincerely,

Jonathan Kinney

Jonathan Kinney
Deputy State Historic Preservation Officer

APPENDIX B: USFWS OFFICIAL SPECIES LIST

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
http://www.fws.gov/newengland

In Reply Refer To: December 31, 2020
Consultation Code: 05E1NE00-2021-SLI-0854
Event Code: 05E1NE00-2021-E-02578
Project Name: Bradley International Airport TW E Relocation Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2021-SLI-0854
Event Code: 05E1NE00-2021-E-02578
Project Name: Bradley International Airport TW E Relocation Project
Project Type: TRANSPORTATION
Project Description: The project consists of reconfiguring/relocating and reconstructing TW E partially within the same footprint of the existing decommissioned Runway 1-19 pavement. New intersection points will be constructed at each end of the proposed TW E. The overall project will result in a net reduction of approximately 1.42 acres of pavement surfaces. The proposed project is located on the existing airfield and will not require any tree removal. The overall project is approximately 27.9 acres in size.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.9380247,-72.67966415695193,14z

Counties: Hartford County, Connecticut

Endangered Species Act Species

There is a total of 0 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

APPENDIX C: 2020 SURVEY REPORT (RARE SPECIES)

Known for excellence.
Built on trust.

2020 SURVEY REPORT

Bradley International Airport (BDL)
Taxiway E
Windsor Locks, Connecticut

November 2020
File No. 15.0166708.01

PREPARED FOR:
McFarland Johnson
53 Regional Drive
Concord, NH, 03301

GZA GeoEnvironmental, Inc.
1350 Main Street, Suite 1400 | Springfield, MA 01103
413-726-2100

Offices Nationwide
www.gza.com

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Habitat Assessment Report and Rare Species Survey
for
Bradley International Airport Taxiway E Reconstruction
2020 Field Season

Introduction

Bradley International Airport (BDL) ("Site") is preparing for work associated with the re-construction of Taxiway E (the "Project"). In support of the project, Biologists from GZA GeoEnvironmental, Inc. (GZA), conducted baseline surveys of the proposed work areas (Survey Area). The Survey Area is essentially the triangular shaped isolated grassland between Taxiway E and the Runway 6-24 and 15-33 intersection along with some areas on the eastern side of Taxiway E. This project is separate from the larger Rare Species Master Plan (RSMP) update and associated surveys that are in-process; however, some of the field data was gathered as part of the RSMP survey effort and was used in preparing this report. The airport is documenting habitat for several rare species as identified by NDDB and listed below:

Invertebrates
- *Brachinus cyanipennis* - Bombardier beetle SC
- *Cicindela formosa generosa* - Big sand tiger beetle SC
- *Harpalus erraticus* - Ground beetle SC
- *Hetaerina americana* - American rubyspot T

Moths
- *Euchlaena madusaria* - Scrub euchlaena T
- *Eumacaria latiferrugata* - Brown-bordered geometer T
- *Euxoa violaris* - Violet dart moth SC
- *Grammia phyllira* - Phyllira tiger moth E
- *Schinia spinosae* - Spinose flower moth SC
- *Zanclognatha martha* - Pine barrens zanclognatha T

Plants
- *Carex davisii* - Davis' sedge T
- *Crocanthemum propinquum* - Low frostweed SC

Avifauna
- *Ammodramus savannarum* - Grasshopper sparrow E
- *Bartramia longicauda* - Upland sandpiper E
- *Dolichonyx oryzivorus* - Bobolink SC
- *Eremophila alpestris* - Horned lark E
- *Falco sparverius* - American kestrel SC
- *Passerculus sandwichensis* - Savannah sparrow SC
- *Pooecetes gramineus* - Vesper sparrow E
- *Sturnella magna* - Eastern meadowlark T
- *Toxostoma rufum* - Brown thrasher SC

Reptiles
- *Terrapene carolina carolina* - Eastern box turtle SC
- *Heterodon platirhinos* - Eastern hognose snake SC

As part of our assessment we evaluated the Survey Area for the presence of the above species based on habitat, as well as site surveys for the two listed rare plant species. This report documents our findings of the Survey Area.

Survey Results

Natural Community Assessment

GZA reviewed the plant communities onsite and mapped several discrete natural communities within and proximal to the Survey Area. These are depicted in Figure 1 and detailed below.

Warm Season Grasslands and Sand Barrens

Warm Season Grasslands: This community is mostly high quality, warm season grassland, with up to 20% of these areas being open sand or sparsely vegetated sand and the remainder being predominately warm season grassland species with some small patches (<5%) of cool season grassland or weedy species. Vegetation height varies from short cropped from routine airport maintenance (approximately 2" in height) to mature grassland up to 24" in height. The dominant species across all mapped areas is little bluestem grass (*Schizachyrium scoparium*), making up > 50% of the vegetative matrix. Bluestem is allowed to grow taller in the interior areas of the Survey Area and is more routinely cut near the runway/taxiway edges. Other common and notable species include blue curl (*Trichosterna dichotomum*), orange grass (*Hypericum gentianoides*), *Bulbostis*, frostweeds (*Crocanthemum spp.*), baptisia (*Baptisia tinctoria*), sand sedge (*Cyperus filiculmis*), dewberry (*Rubus flagellaris*), birds foot violet (*Viola pedata*), sweet everlasting (*Gnaphalium obtusifolium*), rabbits foot clover (*Trifolium arvene*), lichen (*Cladonia rangiferina*), hair capped moss (*Polytrichum species*), bracted plantain (*Plantago aristate*), red top (*Agrostis gigantea*), wood sorrel (*Oxalis stricta*), asters (*Symphotrichum spp.*), and goldenrods (*Solidago nemoralis*). A few shrub species are present including a few short-cropped (from maintenance) scrub oaks (*Quercus ilicifolia*), lowbush blueberry (*Vaccinium angustifolium*), and juniper (*Juniperus communis*). In the areas in and near the open sand, some small patches of higher quality sandplain grassland / sand barrens are present.

Warm Season-Cool Season Grassland Matrix: These areas are a relatively equal mix of warm and cool season grassland and forb species. Some patches of open sand are present; however, they are usually small, disjunct areas that comprise less than 5% of the overall community. These areas are either a mosaic of small patches of either warm season or cool season grassland, or areas where species indicative of both grassland types are present and located where warm and cool season areas transition to one another. These areas have the highest plant diversity on the airfield with most species of both the cool and warm season assemblages represented. In general, some of the species most adapted to warm season conditions and indicators of high quality sand barren habitat are lacking, such as: *Baptisia*, blue curl, birds foot violet, pinweeds (*Leche asp.*) and frostweeds (*Helianthemum canadense*). These species require less competition and are absent from these areas. Cool season and weedy species are prevalent and often intermixed with the warm season species. Common and dominant species here include little bluestem, orange grass, panic grasses (*Panicum depauperatum)*, dewberry, crabgrass (*Digitaria sanguinalis*), fescues (*Festuca sp.*) and purple lovegrass (*Eragrostis spectabilis*).

Cool Season Grassland with some Warm Season Grassland Components: This community is dominated almost entirely by cool season grasses. Some warm season components may be mixed in, mainly little bluestem; however, it is less than 20% of the vegetative matrix. The cool season

species are outcompeting the warm season species in these areas. Soils here are richer with a thicker topsoil which supports more cool season plants. Open ground is mostly absent with a thick groundcover and thick thatch also present. Where present, open ground is not sandy. Common and dominant species include fescues, red top, English plantain (*Plantago lanceolata*), red clover (*Trifolium pratense*), white clover (*Trifolium repens*), rabbits foot clover, ragweed (*Ambrosia artemisiifolia*), deer tongue grass (*Panicum clandestinum*), crabgrass, cinquefoil (*Potentilla canadensis*), wood sorrel, fleabane (*Erigeron sp.*), spotted knapweed (*Centaurea maculosa*), asters, horseweed (*Conyza canadensis*) and yarrow (*Achillea milleforlium*).

Rare Plant Survey

Methods

GZA surveyed for the two state-listed plants identified by CT DEEP as potentially being found on site: Davis' sedge (*Carex davisii*) and low frostweed (*Crocanthemum propinquum).* Areas of potential habitat were identified, and surveys focused on the areas of potential habitat. In total, two (2) man days of effort will be employed for these species of rare plant in the Survey Area. Surveys were conducted by walking parallel transects in June and September within areas of potential habitat. This timing was based on flowering phenology. The habitat descriptions and results of the survey for each species are described below and are also depicted in Figure 1.

Low Frostweed

Low frostweed inhabits open, sandy soils of woodlands, roadsides, clearings, dry fields, and sandplains. A similar species, hoary frostweed (*Crocanthemum bicknellii*), can be found in similar habitats in Connecticut and is differentiated from *C. propinquum* by the outer sepals of the cleistogamous flowers. *C. propinquum*'s outer sepals are apically distinct for 0.2-0.5mm with a tip that is 1-2 times as wide as long, while *C. bicknellii's* sepals are apically distinct for (0.3-) 0.6-1.2 (-1.8) mm, and the tip is mostly 3-5 times as wide as long. Also, the capsule of the cleistogamous flowers in *C. propinquum* is somewhat rounded in cross-section, whereas the capsule of the cleistogamous flowers in *C. bicknellii* is sharply three-angled. Two other species of *Crocanthemum* within the region are *C. canadense* and *C. dumosum* (also a state-listed species of special concern); however, they are easily differentiated by the number of seeds in the capsules of the cleistogamous flowers (1–2 seeds in *C. propinquum* and *C. bicknellii* and 5–14 seeds in *C. canadense* and *C. dumosum*), and that their petal bearing flowers are few and often surpassed by lateral branches while *C. propinquum* and *bicknellii* have many flowers and are often not overpassed by lateral branches (Haines 2011 Flora Novae Angliaea).

Overall, most of the Survey Area is considered low quality habitat for low frostweed, mainly due to the density of the little bluestem, lack of open ground and thatch layer. The areas closest to the runways and taxiways are the least conducive due to the frequent mowing, dense vegetation, and presence of a thatch layer. However, the quality of the habitat differs across the Survey Area with some higher quality habitats present in the areas of open sand and the areas of sparse vegetation around the edges of these open sand patches. All areas of warm season grassland and mixed warm-cool season grassland were surveyed as depicted in Figure 1. Some areas of lower quality habitat, and areas very close to the active runway were not surveyed; however, characterization of the habitat quality was made.

GZA located several small populations of *C. propinquum* and *C. canadense*. These locations are shown in Figure 1 as well as areas of highest habitat quality and potential for this species also shown.

Davis Sedge

Davis' sedge (*Carex davisii*) is found in riparian forests, woodlands and meadow habitats often associated with calcareous soils.

There was no supportive habitat for Davis' sedge found within the Survey Area (wetland habitats). Therefore, no Davis' sedge nor potential habitat for this species is present within the Survey Area.

Rare Invertebrates

Several species of rare lepidoptera, beetles and odonates are known to potentially inhabit the site. Based on a lack of suitable habitat present in the Survey Area, presence of several of the species listed on Page 1 can be ruled out (American Rubyspot, pine barrens zanclognatha, and spinose flower moth). Further studies have been conducted for species of rare invertebrates at the Site, including a previous study by Dr. David Wagner (Insect Fauna of Bradley Airport, 2003) as well as follow-up studies by GZA (results pending as part of the RSMP work).

Of the six listed moth species, four are known to feed on "grasses" and one, sandplain euchlaena, has an association with heath (low bush blueberry in this instance). Both host plant types are present in the Survey Area. Both the 2003 and 2020 studies found these species inhabiting these grassland habitats, and the grassland habitats appear relatively unchanged since the 2003 study. Therefore, these grassland areas provide habitat to the *Euchlaena madusaria, Grammia phyllira, Apamea burgessi and Euxoa violaris*.

Tiger beetle species were surveyed for in 2003 and 2020 and potential habitats are also present in the Survey Area. Three species of tiger beetles were found at the Site in the 2003 study, including the rare big sand tiger beetle (*Cicindela formosa), C. scutellaris*, and *C. punctulata*. The 2020 GZA survey found four species of tiger beetle at the Site, including the rare big sand tiger beetle, the other two species found in 2003, as well as *C. sexgutata*. None of the big sand tiger beetle were found in the Taxiway E Survey Area and potential habitat is limited to small, disconnected, patches of open sand. Overall, habitat quality and findings suggest that the Survey Area is not high-quality tiger beetle habitat for big sand tiger beetle, and likely not supportive habitat. *Cicindela punctulata*, a more common tiger beetle species was found in both 2003 and 2020 in the Survey Area.

Other ground beetle species including *Harpalus erraticus* and *Brachinus cyanipennis* have potential supportive habitats on the airfield based on the sandy soils and amount of open ground present between the grasses. The interior area of the Survey Area with the taller grasses and less frequent mowing regime are better quality habitat compared to the edges by the pavement that are shorter cropped and densely vegetated. Also, the areas of cool season grasses or mixed warm-cool season grasslands are much lower quality habitat for both ground beetle species. The 2003 Wagner study surveyed for these beetles, the results were not available in the material reviewed.

One odonate, the American rubyspot, was listed as potentially being present on the airfield. This species inhabits stream and riparian habitats. This habitat is absent and not proximal to the Survey Area. Therefore, the American rubyspot is assumed to be absent from the Survey Area.

Overall, based on the past surveys and habitats present, the Survey Area contains viable habitat for four of the six listed moth species. Tiger beetle habitat is of lower quality for the rare tiger beetle but present to some degree in the warm season grassland areas as this is also habitat for the other two species of ground beetles.

Grassland Birds

Eight species of grassland birds are noted, as is one species of shrubland bird. The lack of shrubs or nearby shrub habitat provides no habitat for the brown thrasher (*Toxostoma rufu)* within the Survey Area. Habitat for the remaining species of grassland bird is present. Specific surveys for these birds were not conducted, as all are known to inhabit the airfield. However, the quality of the habitats for each species was assessed which corroborated the 2003 assessment for these species. In addition, multiple sightings of several of these species were made during the breeding season, including observations of grasshopper sparrow, vesper sparrow, savannah sparrow, upland sandpiper, eastern meadowlark, horned lark and American kestrel. These sightings confirm the continued occupancy of the site by grassland bird species. The only species identified by NDDB that was not observed in or near the Survey Area was the bobolink.

Grasshopper sparrow tends to forage on bare ground and is known to consume insects. Horned lark forage in bare fields and short vegetation; they feed mostly on weed and grass seeds but capture insects. The vesper sparrow prefers low to sparse grass cover for foraging but will forage in higher vegetation as well. Upland sandpiper tends to forage on shorter vegetation seeking out insect prey. Savannah sparrows generally prefer more dense grass areas for forage and nesting and also feed on insects. Kestrels forage on grasshoppers and other large insects as well as small mammals. The grassland habitats that support forage and nesting for the species listed above are present throughout the Survey Area, and prey surveys conducted by Wagner in 2003 found that many insect taxa are present to support these species. This was corroborated by GZA in 2020 where the same taxa were found in blacklight, pitfall and malaise traps in this area.

Reptiles

Two species of rare reptile are reported associated with the Airport. These include the Eastern Box Turtle and Eastern Hognose Snake. Both species are associated with sandy habitats, particularly the hognose snake, with both using transitional shrub ecotones within the sandplain habitat. Suitable habitat for either species is not present within the Survey Area. The areas are maintained as open, mown grassland. While the physical features (sandy soil) is present for hognose snake burrowing and box turtle nesting, supportive cover and forage habitat is not present nearby and is separated from these habitats by large active and paved areas of the airfield. Suitable habitat and potential occurrence of these two species in the Survey Area is absent.

Summary

Overall, of all the species listed by NDDB as potentially being present at BDL, the Survey Area provides habitat for eight species of grassland bird, four species of rare moth, and has potential habitat for the rare tiger beetles, ground beetle and confirmed low frostweed populations. The highest quality habitat is the warm season grassland habitats depicted in Figure 1, in particular the areas of open sand which have the highest potential to support the rare plant and ground beetles. Grassland birds would use all grassland areas (warm and cool season) with the warm season areas of highest habitat value.

Table 1: Rare Species Likelihood of Occupation of TW-E Survey Area

Species	Habitats Present	High Quality Habitat Present	Habitat Occupied	Notes
Brachinus cyanipennis	Yes	No	Unknown	Low to moderate quality habitat present
Harpalus erraticus	Yes	No	Unknown	Low to moderate quality habitat present
Cicindela formosa generosa	Yes	No	No	Low to moderate quality habitat present
Hetaerina americana	No	No	No	No habitat present
Euchlaena madusaria	Yes	Yes	Yes	Dense areas of warm season grassland
Eumacaria latiferrugata	No	No	No	No shrub areas present
Euxoa violaris	Yes	Yes	Yes	Dense areas of warm season grassland
Grammia phyllira	Yes	Yes	Yes	Dense areas of warm season grassland
Schinia spinosae	No	No	No	Dense areas of warm season grassland
Zanclognatha martha	No	No	No	No shrub areas present
Carex davisii	No	No	No	No wetlands habitat present
Crocanthemum propinquum	Yes	Yes	Yes	Low quality habitat present throughout, patches of high quality habitat present
Ammodramus savannarum	Yes	Yes	Yes	Dense areas of warm season grassland
Bartramia longicauda	Yes	Yes	Yes	Dense areas of warm season grassland
Dolichonyx oryzivorus	Yes	Yes	No	Dense areas of warm season grassland
Eremophila alpestris	Yes	Yes	Yes	Dense areas of warm season grassland
Falco sparverius	Yes	Yes	Yes	Dense areas of warm season grassland
Passerculus sandwichensis	Yes	Yes	Yes	Dense areas of warm season grassland
Pooecetes gramineus	Yes	Yes	Yes	Dense areas of warm season grassland
Sturnella magna	Yes	Yes	Yes	Dense areas of warm season grassland
Toxostoma rufum	No	No	No	No shrub areas present
Terrapene carolina carolina	No	No	No	No connection to supportive habitats
Heterodon platirhinos	No	No	No	No connection to supportive habitats

SITE PHOTOS

TW-E warm season grassland

TW-E warm season grassland

SITE PHOTOS

TW-E Mixed warm/cool season grassland

TW – E warm season grassland with some open sand

SITE PHOTOS

Low Frostweed – TW-E

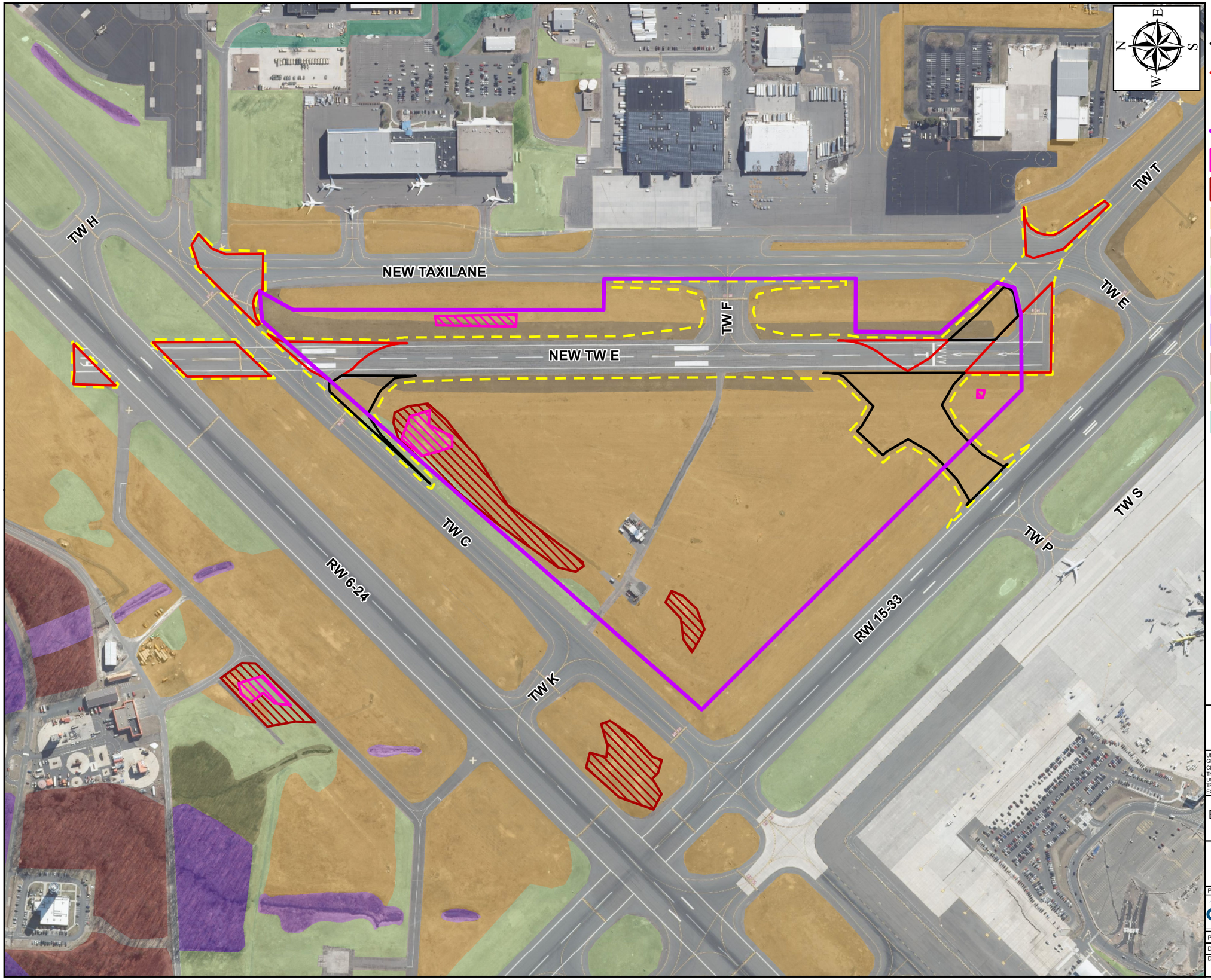
SITE PHOTOS

TW-E open sand (frostweed habitat)

TABLE 2: Master List Flora of BDL Airport TW-E Area (2020)

scientific name *	common name	morph	Warm Season	Mix	Cool Season
Achillea millefolium	yarrow	herb		1	1
Agrostis gigantea	red top-grass	graminoid		1	1
Ambrosia artemisiifolia	ragweed	herb		1	1
Anaphalis margaritacea	pearly everlasting	herb	1	1	
Aristida dichotoma	churchmouse-three-awn	graminoid	1	1	1
Artemisia vulgaris	common mugwort	herb			1
Asclepias amplexicaulis	Wavy leaf Milkweed	herb	1		
Asclepias tuberosa	butterfly weed	herb	1		
Baptisia tinctoria	wild indigo	herb	1		
Carex pensylvanica	pennsylvania sedge	graminoid			1
Centaurea maculosa	spotted knapweed	herb	1	1	1
Cirsium vulgare	bull thistle	herb			1
Cladonia rangiferina	reindeer lichen	lichen	1		1
Comandra umbellata	bastard toadflax	herb		1	
Conyza canadensis	horseweed	herb		1	1
Cyperus filiculmis	sand sedge	herb	1	1	1
Danthonia spicata	poverty grass	graminoid	1	1	
Desmodium ciliare	hairy small-leaf ticktrefoil	herb	1		
Dianthus armeria	Deptford pink	herb	1	1	1
Dichanthelium (Panicum) clandestinum	deer-tongue grass	graminoid	1	1	
Dichanthelium (Panicum) depauperatum	a panic grass	graminoid	1	1	
Dichanthelium (Panicum) dichotomum	a panic grass	graminoid	1	1	
Digitaria sanguinalis	crab grass	graminoid	1	1	1
Eragrostis spectabilis	purple lovegrass	graminoid	1	1	1
Erigeron strigosus	prairie fleabane	herb	1	1	1
Eupatorium hyssopifolium	hyssop-leaved boneset	herb	1	1	1
Euphorbia supina	milk purslane	herb	1	1	
Eurybia (Aster) spectabilis	sandplain aster	herb	1	1	
Euthamia caroliniana (tenuifolia)	slender-leaved goldenrod	herb	1	1	
Euthamia graminifolia	lance-leaved goldenrod	herb	1	1	
Festuca ovina	sheep fescue	graminoid	1	1	1
Festuca rubra	red fescue	graminoid	1	1	1
Fragaria virginiana	wild strawberry	herb		1	1
Gaylussacia baccata	black huckleberry	shrub	1		
Gnaphalium obtusifolium	sweet everlasting	herb	1		
Crocanthemum canadense	frostweed (a rockrose)	herb	1		
Crocanthemum propinquum	low frostweed	herb	1		
Hieracium pilosella	mouse ear	herb	1	1	1
Hudsonia tomentosa	heather	shrub	1		1
Hypericum gentianoides	orange-grass	herb	1		1
Hypericum perforatum	common St. Johnswort	herb	1	1	1
Hypochoeris radicata	cat's ear	herb	1	1	
Ionactis (Aster) linariifolius	stiff aster	herb	1	1	
Juncus tenuis	path rush	graminoid	1	1	1
Juniperus communis	common juniper	shrub	1	1	
Krigia virginica	dwarf dandelion	herb	1	1	
Lechea maritima	beach pinweed	herb	1	1	
Lechea minor	lesser pinweed	herb	1	1	
Lechea sp.	a pinweed	herb	1	1	
Lespedeza capitata	round-headed bush clover	herb	1	1	1
Linaria canadensis	blue toadflax	herb	1	1	1
Lotus corniculatus	birdsfoot trefoil	herb		1	1
Melampyrum lineare	cowwheat	herb	1	1	

scientific name *	common name	morph	Warm Season	Mix	Cool Season
Oxalis stricta	yellow wood-sorrel	herb			1
Panicum virgatum	switchgrass	graminoid	1	1	
Paspalum setaceum var. setaceum	sand paspalum	graminoid	1		
Plantago aristata	bracted plaintain	herb	1	1	
Plantago lanceolata	English plantain	herb		1	1
Polygala nuttallii	Nuttall's milkwort	herb	1		
Polygala polygama	racemed milkwort	herb	1		
Polygonella articulata	sand jointweed	herb	1		
Polytrichum species	a haircap moss	moss	1	1	1
Potentilla canadensis	dwarf cinquefoil	herb	1		
Quercus ilicifolia	scrub oak	shrub	1	1	
Rhus radicans	poison ivy	vine			1
Rubus flagellaris	prickly dewberry	vine	1	1	1
Rumex acetosella	sheep sorrel	herb	1	1	1
Schizachyrium scoparium	little bluestem	graminoid	1	1	1
Securigera varia	crown vetch	herb		1	1
Sericocarpus asteroides (Aster paternus)	toothed white-topped aster	herb	1	1	
Sericocarpus linifolius (Aster solidagineus	narrow-leaved white-topped aster	herb	1	1	
Setaria sp.	a foxtail	graminoid		1	1
Solidago nemoralis	gray goldenrod	herb		1	1
Solidago rugosa	rough-stemmed goldenrod	herb		1	1
Symphyotrichum (Aster) dumosus	bushy aster	herb			1
Symphyotrichum (Aster) ericoides	white heath aster	herb		1	1
Taraxacum officinale	dandelion	herb			1
Trichostema dichotomum	blue curls	herb	1	1	
Trifolium agragrium	hop clover	herb		1	1
Trifolium arvense	rabbit foot clover	herb	1	1	1
Trifolium pratense	red clover	herb		1	1
Trifolium repens	white clover	herb		1	1
Vaccinium angustifolium	common lowbush blueberry	shrub	1	1	1
Verbascum thapsus	common mullein	herb	1	1	1
Viola pedata	bird's foot violet	herb	1		



LEGEND

- NEW PAVEMENT TO BE INSTALLED
- PAVEMENT TO BE REMOVAL
- WORK LIMITS
- LIMITS OF SURVEY - 2020
- LOW FROSTWEED VERIFIED OCCUPIED HABITAT
- LOW FROSTWEED POTENTIAL HIGH QUALITY HABITAT
- WARM SEASON GRASSLAND
- WARM SEASON-COOL SEASON MATRIX
- COOL SEASON GRASSLAND
- WET MEADOW
- FORESTED WETLAND
- UPLAND FOREST
- SHRUB SHRUB WETLAND
- LANDSCAPED

NOTES:

1. BASE MAP SOURCE: CONNECTICUT 2019 ORTHO IMAGERY.
2. HABITAT BOUNDARIES SHOWN HEREON WERE DELINEATED ON JULY AND AUGUST, 2020, BY GZA 1350 MAIN STREET, SUITE 1400, SPRINGFIELD, MA 01103.

0 200 400 800
Feet

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR THE USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

BRADLEY AIRPORT RARE SPECIES MANAGEMENT UPDATE, WINDSOR LOCKS, CT

BRADLEY AIRPORT PLAN OVERLAY MAPPING

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: MCFARLAND-JOHNSON INC 53 REGIONAL DRIVE, CONCORD, NH 03301	
PROJ MGR: SDR	REVIEWED BY: GPD	CHECKED BY: SDR	FIGURE 1
DESIGNED BY: JRC	DRAWN BY: JRC	SCALE: 1 in = 400 ft	
DATE: 11/06/2020	PROJECT NO: 15.0166708.01	REVISION NO:	

GZA GeoEnvironmental, Inc.

APPENDIX D: PROJECT PLANS

STRUCTURE TABLE

STRUCTURE	RIM	INV(S) IN	INV OUT	DESCRIPTION	NORTHING	EASTING
EX CB 1	167.23	161.45		EX CATCH BASIN (TO REMAIN)	904111.39	1019244.44
S1	165.22		162.25	CATCH BASIN (D-751-5.2)	904129.57	1019085.33
S2	165.60	MTCH EX*	MTCH EX*	CATCH BASIN (D-751-5.1)	903910.65	1018946.33
S3	165.90	MTCH EX*	MTCH EX*	DRAIN MANHOLE (D-751-5.1)	903909.65	1018927.76
S4	166.55		162.50	CATCH BASIN (D-751-5.2)	901989.42	1019627.78
S5	169.07	MTCH EX*	160.66	CATCH BASIN (D-751-5.2)	901770.12	1018983.09
S6	169.41	160.50 MTCH EX*	158.60	DRAIN MANHOLE (D-751-5.1)	901742.70	1018964.91
S7	329.39	MTCH EX*	158.89	CATCH BASIN (D-751-5.2)	901302.08	1018991.07
S8	168.17	158.80 156.75	156.73	DRAIN MANHOLE (D-751-5.1)	901301.82	1018972.08

*SEE NOTE 6

PIPE TABLE

NAME	SIZE	LENGTH	SLOPE	DESCRIPTION	FROM STRC	TO STRC
PIPE 1	12"	160'	0.50%	REINFORCED CONCRETE PIPE (D-701-5.1A)	S1	EX CB 1
PIPE 2	12"	19'	0.50%	REINFORCED CONCRETE PIPE (D-701-5.1A)	S2	S3
PIPE 4A	18"	8'	MTCH EX*	REINFORCED CONCRETE PIPE (INCID. TO ITEM D-751-5.2)	S4	
PIPE 5	12"	33'	0.50%	REINFORCED CONCRETE PIPE (D-701-5.1A)	S5	S6
PIPE 5A	8"	8'	MTCH EX*	REINFORCED CONCRETE PIPE (INCID. TO ITEM D-751-5.2)		S5
PIPE 6	15"	441'	0.42%	REINFORCED CONCRETE PIPE (D-751-5.1B)	S6	S8
PIPE 6A	12"	8'	MTCH EX*	REINFORCED CONCRETE PIPE (INCID. TO ITEM D-751-5.1)		S6
PIPE 7	12"	19'	0.50%	REINFORCED CONCRETE PIPE (D-701-5.1A)	S7	S8
PIPE 7A	8"	8'	MTCH EX*	REINFORCED CONCRETE PIPE (INCID. TO ITEM D-751-5.2)		S7
PIPE 8A	18"	8'	0.42%	REINFORCED CONCRETE PIPE (INCID. TO ITEM D-751-5.1)	S8	
PIPE 9	36"	401'	0.45%	REINFORCED CONCRETE PIPE (D-701-5.1C)		

*SEE NOTE 6

LEGEND:

- 169 — PROPOSED MAJOR CONTOUR
- 169.5 — PROPOSED MINOR CONTOUR
- 169 — EXISTING MAJOR CONTOUR
- 169.5 — EXISTING MINOR CONTOUR
- SF — EROSION CONTROL LOG
- LIMIT OF DISTURBANCE
- INLET PROTECTION BAG
- DRAIN PIPE
- CATCH BASIN
- DRAIN MANHOLE
- ADJUST DRAIN STRUCTURE
- ADJUST ELECTRICAL MANHOLE

NOTES:

1. FOR CONSTRUCTION SAFETY AND PHASING SEE SHEETS CS-00 TO CS-08.
2. FOR DRAINAGE DETAILS SEE SHEET GR-07.
3. FOR EROSION CONTROL DETAILS SEE SHEET EC-01.
4. FOR ELECTRICAL LAYOUT SEE SHEETS EP-01 TO EP-06.
5. STABILIZED CONSTRUCTION ENTRANCE SHALL BE INSTALLED IN A LOCATION AS DIRECTED BY THE RESIDENT PROJECT REPRESENTATIVE AND SHALL BE PAID UNDER ITEM C-102-5.3.
6. FOR EXISTING DRAINAGE INVERTS AND OTHER EXISTING INFORMATION SEE SHEETS EX-01 TO EX-06.
7. INSTALL NEW 12-INCH PIPE TO CONNECT NEW CATCH BASIN S1 TO EXISTING CATCH BASIN 1. PIPE CONNECTIONS TO EXISTING CATCH BASIN SHALL BE INCIDENTAL TO ITEM D-701-5.1A.

0 40 80 120 FT
SCALE

BID DOCUMENTS

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECT DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

REV	DATE	DESCRIPTION	BY

McFarland Johnson
53 REGIONAL DRIVE
CONCORD, NEW HAMPSHIRE 03301

BRADLEY INTERNATIONAL AIRPORT
WINDSOR LOCKS, CONNECTICUT

CONSTRUCT TAXIWAY E

GRADING, DRAINAGE, AND EROSION CONTROL PLAN (1 OF 6)

SCALE: 1" = 40'	DESIGN: SSS
DRAWN: BRF	PROJECT: 18621.04
CHECKED: BMB	DATE: MARCH 2021

GR-01
38 OF 98

K:\CAT1-18621.04 CONSTRUCT TW E\DRAWINGS\SHEET FILES\18621.04-GRAD.DWG

LEGEND:

169	PROPOSED MAJOR CONTOUR
169.5	PROPOSED MINOR CONTOUR
169	EXISTING MAJOR CONTOUR
169.5	EXISTING MINOR CONTOUR
	LIMIT OF DISTURBANCE
	DRAIN PIPE
	CATCH BASIN
	DRAIN MANHOLE
	ADJUST DRAIN STRUCTURE
	ADJUST ELECTRICAL MANHOLE
SF	EROSION CONTROL LOG
	INLET PROTECTION BAG

NOTES:

1. SEE SHEET GR-01 FOR ADDITIONAL NOTES.
2. REPLACE EXISTING CATCH BASIN S2. CONNECT TO EXISTING 10-INCH DRAIN LINE TO THE NORTH. CONNECT TO EXISTING 10-INCH DRAIN LINE TO THE SOUTH. PIPE CONNECTIONS TO NEW CATCH BASIN SHALL BE INCIDENTAL TO ITEM D-751-5.2
3. REPLACE EXISTING DRAIN MANHOLE S3. CONNECT TO EXISTING 12-INCH DRAIN LINE TO THE NORTH. CONNECT TO EXISTING 12-INCH DRAIN LINE TO THE SOUTH. CONNECT TO EXISTING 18-INCH DRAIN LINE TO THE WEST. PIPE CONNECTIONS TO NEW DRAIN MANHOLE SHALL BE INCIDENTAL TO ITEM D-751-5.1.
4. NOTES 2 & 3 PROVIDE INFORMATION REGARDING CONNECTIONS TO EXISTING DRAINAGE ONLY. REFER TO PIPE SCHEDULE ON SHEET GR-01 FOR ADDITIONAL PIPE INSTALLATION INFORMATION.

BID DOCUMENTS

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECT DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

REV	DATE	DESCRIPTION	BY

STATE OF CONNECTICUT · BRIAN M. BENNETT · 28050 · LICENSED PROFESSIONAL ENGINEER

McFarland Johnson
53 REGIONAL DRIVE
CONCORD, NEW HAMPSHIRE 03301

BRADLEY INTERNATIONAL AIRPORT
WINDSOR LOCKS, CONNECTICUT

CONSTRUCT TAXIWAY E

GRADING, DRAINAGE, AND EROSION CONTROL PLAN (2 OF 6)

SCALE: 1" = 40'	DESIGN: SSS		
DRAWN: BRF	PROJECT: 18621.04	GR-02	
CHECKED: BMB	DATE: MARCH 2021	39 OF 98	

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0 40 80 120 FT

SCALE

BID DOCUMENTS

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECT DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

LEGEND:

Symbol	Description
169	PROPOSED MAJOR CONTOUR
169.5	PROPOSED MINOR CONTOUR
169	EXISTING MAJOR CONTOUR
169.5	EXISTING MINOR CONTOUR
	LIMIT OF DISTURBANCE
	DRAIN PIPE
	CATCH BASIN
	DRAIN MANHOLE
	ADJUST DRAIN STRUCTURE
	ADJUST ELECTRICAL MANHOLE
SF	EROSION CONTROL LOG
	INLET PROTECTION BAG

NOTES:

1. SEE SHEET GR-01.

REV	DATE	DESCRIPTION	BY

STATE OF CONNECTICUT BRIAN M. BENNETT 26020 LICENSED PROFESSIONAL ENGINEER

McFarland Johnson
53 REGIONAL DRIVE
CONCORD, NEW HAMPSHIRE 03301

BRADLEY INTERNATIONAL AIRPORT
WINDSOR LOCKS, CONNECTICUT

CONSTRUCT TAXIWAY E

GRADING, DRAINAGE, AND EROSION CONTROL PLAN (3 OF 6)

SCALE: 1" = 40'	DESIGN: SSS		
DRAWN: BRF	PROJECT: 18621.04		GR-03
CHECKED: BMB	DATE: MARCH 2021		40 OF 98

LEGEND:

169 (solid line)	PROPOSED MAJOR CONTOUR
169.5 (solid line)	PROPOSED MINOR CONTOUR
169 (dashed line)	EXISTING MAJOR CONTOUR
169.5 (dashed line)	EXISTING MINOR CONTOUR
	LIMIT OF DISTURBANCE
	DRAIN PIPE
	CATCH BASIN
	DRAIN MANHOLE
	ADJUST DRAIN STRUCTURE
	ADJUST ELECTRICAL MANHOLE
SF	EROSION CONTROL LOG
	INLET PROTECTION BAG

NOTES:

1. SEE SHEET GR-01 FOR ADDITIONAL NOTES.
2. INSTALL NEW CATCH BASIN 'S5' ON EXISTING DRAIN LINE. CONNECT TO EXISTING 8-INCH DRAIN LINE TO THE NORTH (EXISTING PIPE REMOVED TO THE SOUTH). PIPE CONNECTIONS TO NEW CATCH BASIN SHALL BE INCIDENTAL TO ITEM D-751-5.2.
3. REPLACE EXISTING DRAIN MANHOLE 'S6'. CONNECT TO EXISTING 12-INCH DRAIN LINE TO THE NORTH. PIPE CONNECTIONS TO NEW DRAIN MANHOLE SHALL BE INCIDENTAL TO ITEM D-751-5.1.
4. INSTALL NEW CATCH BASIN 'S7' ON EXISTING DRAIN LINE. CONNECT TO EXISTING 8-INCH DRAIN LINE TO THE SOUTH (EXISTING PIPE REMOVED TO THE NORTH). PIPE CONNECTIONS TO NEW CATCH BASIN SHALL BE INCIDENTAL TO ITEM D-751-5.2.
5. INSTALL NEW DRAIN MANHOLE 'S8' ON EXISTING DRAIN LINE. CONNECT TO EXISTING 18-INCH DRAIN LINE TO THE SOUTH. PIPE CONNECTIONS TO NEW DRAIN MANHOLE SHALL BE INCIDENTAL TO ITEM D-751-5.1.
6. NOTES 2 THROUGH 5 PROVIDE INFORMATION REGARDING CONNECTIONS TO EXISTING DRAINAGE ONLY. REFER TO PIPE SCHEDULE ON SHEET GR-01 FOR ADDITIONAL PIPE INSTALLATION INFORMATION.

BID DOCUMENTS

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECT DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

REV	DATE	DESCRIPTION	BY

McFarland Johnson
53 REGIONAL DRIVE
CONCORD, NEW HAMPSHIRE 03301

BRADLEY INTERNATIONAL AIRPORT
WINDSOR LOCKS, CONNECTICUT

CONSTRUCT TAXIWAY E

GRADING, DRAINAGE, AND EROSION CONTROL PLAN (4 OF 6)

SCALE: 1" = 40'	DESIGN: SSS
DRAWN: BRF	PROJECT: 18621.04
CHECKED: BMB	DATE: MARCH 2021

GR-04

0 40 80 120 FT
SCALE

BID DOCUMENTS

LEGEND:

169	PROPOSED MAJOR CONTOUR
169.5	PROPOSED MINOR CONTOUR
169	EXISTING MAJOR CONTOUR
169.5	EXISTING MINOR CONTOUR
SF	EROSION CONTROL LOG
	INLET PROTECTION BAG
	LIMIT OF DISTURBANCE
	DRAIN PIPE
	CATCH BASIN
	DRAIN MANHOLE
	ADJUST DRAIN STRUCTURE
	ADJUST ELECTRICAL MANHOLE

NOTES:

1. SEE SHEET GR-01 FOR ADDITIONAL NOTES.
2. INSTALL NEW 36-INCH CONCRETE DRAIN PIPE BETWEEN EXISTING DRAIN STRUCTURES AT EXISTING INVERTS. PIPE CONNECTIONS TO EXISTING DRAIN STRUCTURES SHALL BE INCIDENTAL TO ITEM D-701-5.1C. SEE SHEET EX-05 FOR EXISTING INVERTS.

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECT DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

REV	DATE	DESCRIPTION	BY

STATE OF CONNECTICUT · BRIAN M. BENNETT · 20030 · LICENSED PROFESSIONAL ENGINEER

McFarland Johnson
53 REGIONAL DRIVE
CONCORD, NEW HAMPSHIRE 03301

BRADLEY INTERNATIONAL AIRPORT
WINDSOR LOCKS, CONNECTICUT

CONSTRUCT TAXIWAY E

GRADING, DRAINAGE, AND EROSION CONTROL PLAN (5 OF 6)

SCALE: 1" = 40'	DESIGN: SSS		
DRAWN: BRF	PROJECT: 18621.04	GR-05	
CHECKED: BMB	DATE: MARCH 2021	42 OF 98	

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LEGEND:

169	PROPOSED MAJOR CONTOUR
169.5	PROPOSED MINOR CONTOUR
169	EXISTING MAJOR CONTOUR
169.5	EXISTING MINOR CONTOUR
	LIMIT OF DISTURBANCE
	DRAIN PIPE
	CATCH BASIN
	DRAIN MANHOLE
	ADJUST DRAIN STRUCTURE
	ADJUST ELECTRICAL MANHOLE
SF	EROSION CONTROL LOG
	INLET PROTECTION BAG

0 40 80 120 FT

SCALE

NOTES:

1. SEE SHEET GR-01 FOR ADDITIONAL NOTES.
2. REPLACE EXISTING CATCH BASIN S4. CONNECT TO EXISTING 18-INCH DRAIN LINE TO THE NORTH (EXISTING PIPE REMOVED TO THE SOUTH). PIPE CONNECTIONS TO NEW CATCH BASIN SHALL BE INCIDENTAL TO ITEM D-751-5.2.

BID DOCUMENTS

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECT DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

STATE OF CONNECTICUT BRIAN M. BENNETT LICENSED PROFESSIONAL ENGINEER

REV	DATE	DESCRIPTION	BY

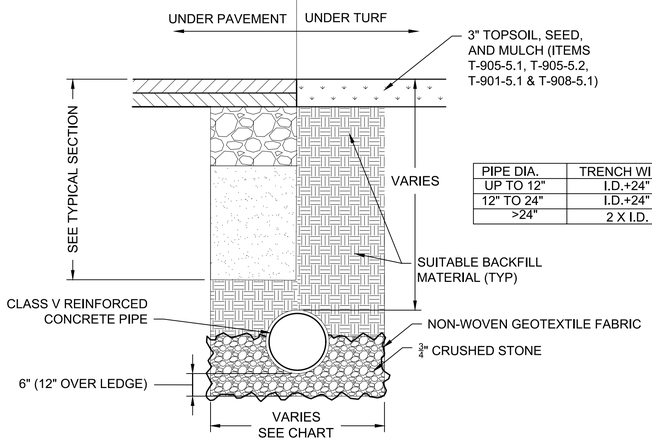
McFarland Johnson
53 REGIONAL DRIVE
CONCORD, NEW HAMPSHIRE 03301

BRADLEY INTERNATIONAL AIRPORT
WINDSOR LOCKS, CONNECTICUT

CONSTRUCT TAXIWAY E

GRADING, DRAINAGE, AND EROSION CONTROL PLAN (6 OF 6)

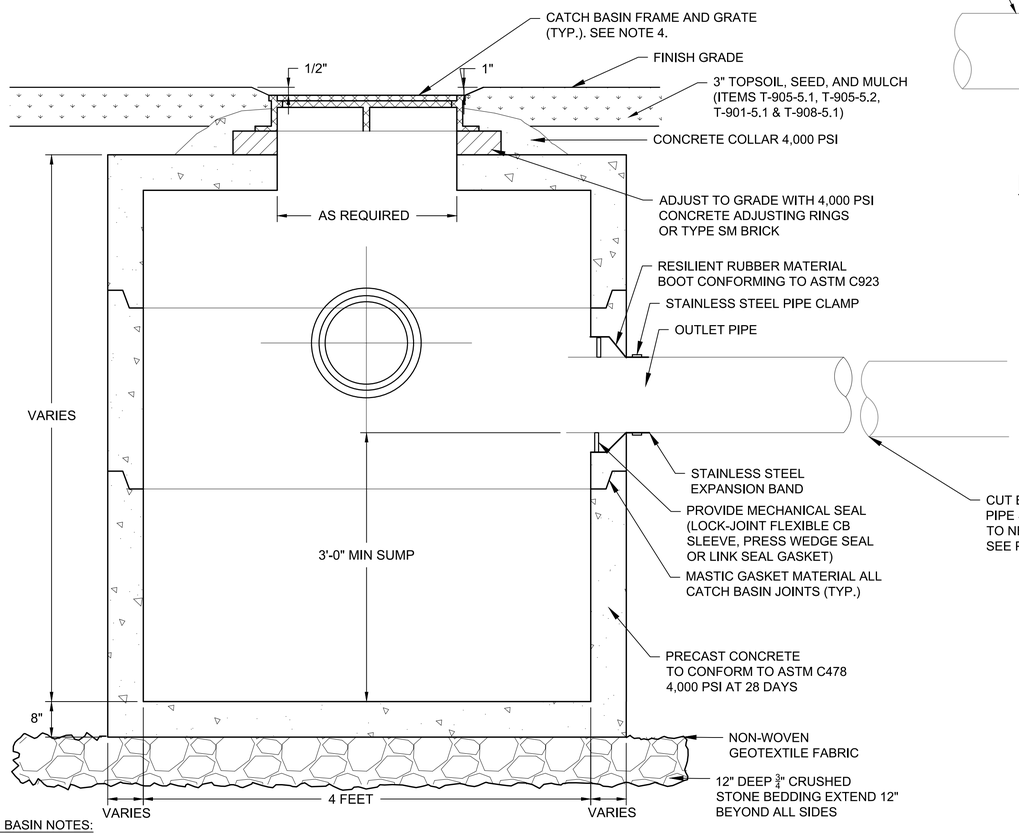
SCALE: 1" = 40'	DESIGN: SSS		
DRAWN: BRF	PROJECT: 18621.04	GR-06	
CHECKED: BMB	DATE: MARCH 2021	43 OF 98	



PIPE DIA.	TRENCH WIDTH
UP TO 12"	I.D.+24"
12" TO 24"	I.D.+24"
>24"	2 X I.D.

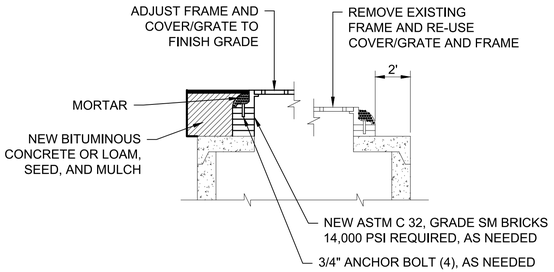
DRAIN PIPE NOTES:
1. CONTRACTOR SHALL SHORE TRENCH SIDES AS REQUIRED.
2. CONTRACTOR SHALL DEWATER TRENCH EXCAVATION AS REQUIRED.
3. CONTRACTOR SHALL COMPACT THE EXCAVATED SUBGRADE TO 95% OF ASTM D-1557 UNDER TURF AND 100% OF ASTM D-1557 UNDER PAVEMENT AND WITHIN 10' OF ALL EDGES OF PAVEMENT EVEN IN TURF.

DRAIN PIPE TRENCH DETAIL
NOT TO SCALE
(ITEMS D-701-5.1A, D-701-5.1B, D-701-5.1C)

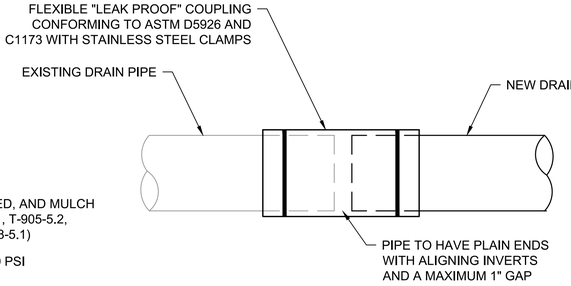


CATCH BASIN NOTES:
1. ALL PREFABRICATED REINFORCED CONCRETE STRUCTURES AND FRAME AND GRATES SHALL BE DESIGNED AND CONSTRUCTED TO SUPPORT A MINIMUM OF A 100,000 LB. SINGLE WHEEL LOADING. THE CONTRACTOR IS REQUIRED TO SUBMIT SHOP DRAWINGS AND MANUFACTURER CERTIFICATIONS TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION. SHOP DRAWINGS FOR LOADING SHALL BE STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN CONNECTICUT.
2. THE WALL THICKNESS SHALL INCREASE IN SIZE TO CONFORM WITH THE REQUIREMENTS OF THE MANUFACTURER OF THE RESILIENT RUBBER BOOT AND BE SIZED ACCORDING TO THE DIAMETER OF THE STRUCTURE AND THE SIZE AND TYPE OF PIPE. THE WALL THICKNESS SHALL NOT BE LESS THAN 6" FOR STEEL COVER REQUIREMENTS AND SHALL BE DESIGNED TO MEET ALL REQUIREMENTS INCLUDING THE REQUIRED LOADING IN NOTE 1.
3. CONTRACTOR SHALL COMPACT THE EXCAVATED SUBGRADE TO 100% OF ASTM D-1557 WITHIN 10' OF ALL EDGES OF PAVEMENT EVEN IN TURF.
4. THE FRAME AND GRATE FOR ALL AIRFIELD CATCH BASINS SHALL BE AIRPORT RATED AND HAVE A MINIMUM OPENING AREA OF 4.8 SF, AND A WEIR PERIMETER OF 13.8 FT (NEENAH FOUNDRY R-3475 F OR APPROVED EQUAL).
5. ALL PREFAB-CONCRETE STRUCTURES SHALL HAVE COURSE, FINE, AND CONCRETE MATERIALS TESTED FOR ALKALI-SILICA REACTION (ASR) USING AASHTO T 303 MODIFIED.

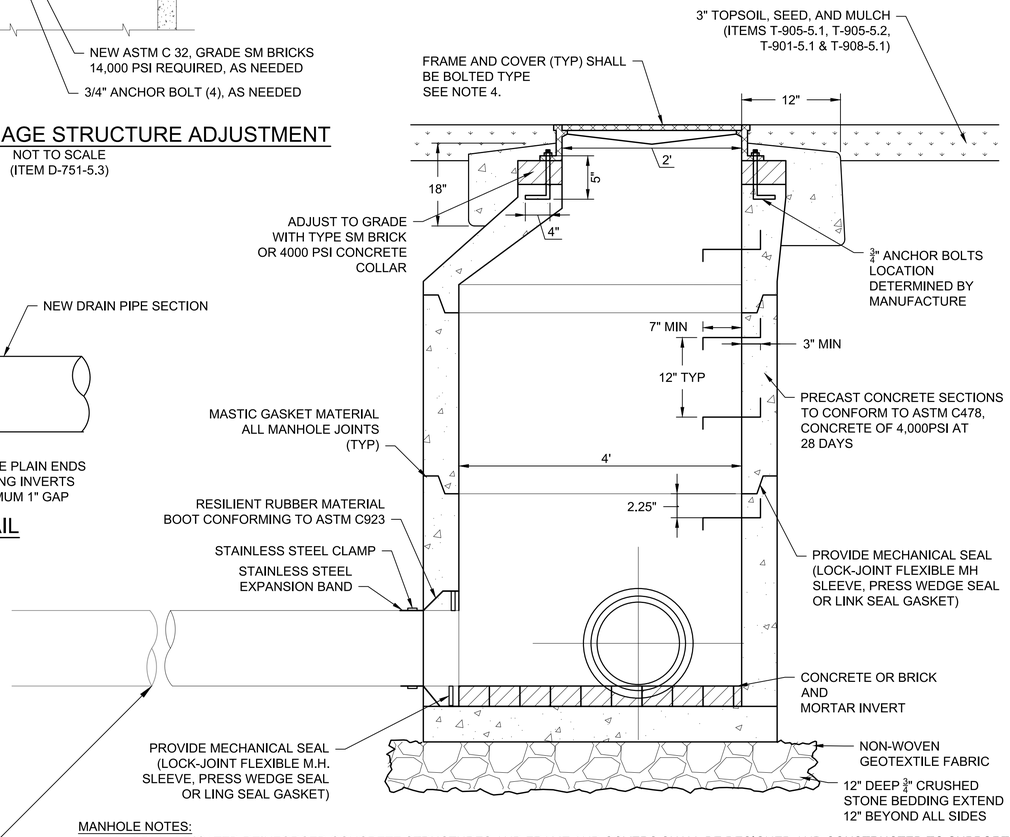
CATCH BASIN DETAIL
NOT TO SCALE
(ITEMS D-751-5.2)



MANHOLE OR DRAINAGE STRUCTURE ADJUSTMENT
NOT TO SCALE
(ITEM D-751-5.3)



PIPE CONNECTION DETAIL
NOT TO SCALE
(INCID. TO ITEMS D-751-5.1, D-751-5.2)



MANHOLE NOTES:
1. ALL PREFABRICATED REINFORCED CONCRETE STRUCTURES AND FRAME AND COVERS SHALL BE DESIGNED AND CONSTRUCTED TO SUPPORT A MINIMUM OF A 100,000 LB. SINGLE WHEEL LOADING. THE CONTRACTOR IS REQUIRED TO SUBMIT SHOP DRAWINGS AND MANUFACTURER CERTIFICATIONS TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION. SHOP DRAWINGS FOR LOADING SHALL BE STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN CONNECTICUT.
2. THE WALL THICKNESS SHALL INCREASE IN SIZE TO CONFORM WITH THE REQUIREMENTS OF THE MANUFACTURER OF THE RESILIENT RUBBER BOOT AND BE SIZED ACCORDING TO THE DIAMETER OF THE STRUCTURE AND THE SIZE AND TYPE OF PIPE. THE WALL THICKNESS SHALL NOT BE LESS THAN 6" FOR STEEL COVER REQUIREMENTS AND SHALL BE DESIGNED TO MEET ALL REQUIREMENTS INCLUDING THE REQUIRED LOADING IN NOTE 1.
3. CONTRACTOR SHALL COMPACT THE EXCAVATED SUBGRADE TO 100% OF ASTM D-1557 UNDER TURF AND 100% OF ASTM D-1557 WITHIN 10' OF ALL EDGES OF PAVEMENT EVEN IN TURF.
4. THE FRAME AND COVER FOR ALL AIRFIELD MANHOLES SHALL BE AIRPORT RATED AND HAVE NOMINAL OPENING DIAMETER SIZE OF 2' (NEENAH FOUNDRY R-3492 OR APPROVED EQUAL) AND SHALL BE MARKED "STORM".

DRAIN MANHOLE DETAIL
NOT TO SCALE
(ITEM D-751-5.1)

BID DOCUMENTS

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECT DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

REV	DATE	DESCRIPTION	BY

McFarland Johnson
53 REGIONAL DRIVE
CONCORD, NEW HAMPSHIRE 03301

BRADLEY INTERNATIONAL AIRPORT
WINDSOR LOCKS, CONNECTICUT
CONSTRUCT TAXIWAY E
DRAINAGE DETAILS

SCALE: NTS	DESIGN: SSS	**GR-07**
DRAWN: BRF	PROJECT: 18621.04	44 OF 98
CHECKED: BMB	DATE: MARCH 2021	

K:\CAD\T-18621.04 CONSTRUCT TW E\DRAWINGS\SHEET FILES\18621.04-DET5.DWG

EROSION CONTROL SPECIFICATIONS FOR UPLAND AREAS:

1. SOIL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS.

2. RECOGNIZING THAT IMMEDIATE ATTENTION TO EROSION CONTROL PRACTICES DRAMATICALLY IMPROVES SOIL AND MOISTURE CONSERVATION AND REDUCES NEGATIVE IMPACTS ON WATER QUALITY. THE CONTRACTOR SHALL GIVE HIGH PRIORITY TO THE DAILY AND TIMELY INSTALLATION OF BOTH TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL MEASURES. IMMEDIATE INSTALLATION OF PRACTICES USUALLY REDUCES LONG TERM COSTS TO THE CONTRACTOR AND PROVIDES BENEFITS TO THE DEVELOPER AND THE PUBLIC GOOD.

3. EROSION CONTROL PRACTICES ARE SHOWN ON THE PLANS WITH RESPECT TO LOCATION AS DETERMINED FROM EXISTING TOPOGRAPHY. CHANGES MAY BE INDICATED IN THE FIELD TO IMPROVE EROSION AND SEDIMENT CONTROL.

4. CONSTRUCTION SHALL PROCEED UNIT BY UNIT TO FACILITATE INSTALLATION OF EROSION CONTROL MEASURES AND THE COMPLETION OF GRADING, SEEDING, AND LANDSCAPING AS SOON AS POSSIBLE WITHIN A UNIT. THIS PROCEDURE SHOULD RESULT IN THE EXPOSURE OF THE SMALLEST PRACTICAL LAND AREA AT ANY ONE TIME.

5. PRIOR TO ANY DISTURBANCE WITHIN EXISTING GRASSLAND AREAS DEPTH OF TOPSOIL SHALL BE EVALUATED BY A BIOLOGIST, AND EXISTING TOPSOIL SHALL BE REMOVED AND STOCKPILED SITE FOR RESTORATION OF GRASSLAND AREAS.

6. ALL DISTURBED UPLAND AREAS SHALL HAVE TOPSOIL SPREAD (3" MINIMUM (REFER TO PLANS)) WITHIN TWO WEEKS AND BE LIMED, FERTILIZED, TILLED, SEEDED AND MULCHED. ALL SLOPES 3:1 (1 RISE ON 3 RUN) AND STEEPER SHALL HAVE MULCH HELD IN PLACE WITH BIODEGRADABLE JUTE NETTING OR EROSION CONTROL BLANKET, STAPLED AND STAKED. EACH AREA SHALL BE LIMED, FERTILIZED, PREPARED, SEEDED AND MULCHED (WITH ANCHORED NETTING OR BLANKET IF REQUIRED) WITHIN 14 DAYS OF FINAL GRADING. WHEN PERMANENT SEEDING CANNOT BE INSTALLED BY SEPTEMBER 15, TEMPORARY SEEDING AND MULCHING OF ALL DISTURBED AREAS SHALL BE INSTALLED IMMEDIATELY AND MAINTAINED IN THAT CONDITION UNTIL PERMANENT PRACTICES CAN BE INSTALLED IN THE FOLLOWING PLANTING SEASON.

7. TEMPORARY STABILIZATION OF DISTURBED UPLAND AREAS (IF REQUIRED):

SEEDBED PREPARATION: TILL FOUR INCHES DEEP MIXING IN FERTILIZER AND GROUND LIMESTONE.
APPLY LIMESTONE 2 TONS/ACRE (100#/1,000 SQ. FT.) OR ACCORDING TO SOIL TEST.

FERTILIZE: UNIFORMLY APPLY NOT LESS THAN 400#/ACRE (14#/1,000 SQ. FT.) OF 10-10-10 OR EQUIVALENT OR AS INDICATED BY SOIL TEST. FORTY PERCENT OF NITROGEN SHOULD BE IN ORGANIC FORM.

SEEDING: SELECT APPROPRIATE SEEDING MIXTURE FROM TABLE 1 BELOW. SPREAD SEED UNIFORMLY. FIRM SOIL BY ROLLING OR PACKING; IF NOT FEASIBLE, THEN RAKE LIGHTLY TO COVER SEEDS.

MULCHING: MULCH ALL DISTURBED AREAS WITH 2 TONS OF HAY OR STRAW PER ACRE (90-100#/1,000 SQ. FT.). ANCHOR ON ALL SLOPES 3:1 OR STEEPER AND FLATTER SLOPES SUBJECT TO WASH OR WIND BLOWN. USE JUTE (OR OTHER BIODEGRADABLE) NETTING OR BLANKET. STAKING AND STAPLING MAY BE REQUIRED.

8. PERMANENT STABILIZATION OF DISTURBED UPLAND AREAS:
SEED BED PREPARATION: TOPSOIL (SANDY TOPSOIL, TOPSOIL, OR SILT TOPSOIL), FRIABLE, FREE OF TREE ROOTS, WEEDS, STONES MORE THAN 1-1/2 INCHES IN DIAMETER OR LENGTH SHALL BE PLACED OVER ALL DISTURBED AREAS IN A 4" MINIMUM (REFER TO PLANS) THICK LAYER.

TOPSOIL: IMPORTED TOPSOIL SHALL BE MIXED ON-SITE WITH NATIVE TOPSOIL AND SHALL BE MIXED ON SIGHT ROUGHLY 4:1 TO THE TEXTURE OF THE EXISTING SOILS. LAB ANALYSIS OF EXISTING REMOVED TOPSOIL SHALL BE PERFORMED BY THE CONTRACTOR TO DETERMINE ORGANIC CONTENT AND TEXTURE OF THE NATIVE TOPSOIL FOR A MORE ACCURATE RATIO OF THE FINAL IMPORTED TOPSOIL AND STOCKPILE MIXTURE. SOILS SHALL BE FREE OF INVASIVE SPECIES, HERBICIDES AND TOXIC MATERIALS. SOIL SHALL BE INSPECTED AND APPROVED BY BIOLOGIST AND ENGINEER PRIOR TO USE.

SEEDING: WARM SEASON SEED MIX:

A. NE NATIVE WARM SEASON GRASS MIX	LBS/ACRE
LITTLE BLUESTEM	- (50%)
BIG BLUESTEM	- (10%)
VIRGINIA WILD RYE	- (10%)
INDIAN GRASS	- (10%)
RED FESCUE	- (10%)
SWITCH GRASS	- (10%)
TOTALS -	23 LBS/ACRE

*PERCENT MAY VARY AS APPROVED BY BIOLOGIST

SEEDING METHODS: SEEDING SHOULD BE PERFORMED BY THE FOLLOWING METHOD:
HYDROSEEDING WITH SUBSEQUENT TRACKING.
TRACKING THE SEEDING WITH SMALL TRACK CONSTRUCTION EQUIPMENT.
TRACKING SHOULD BE ORIENTED UP AND DOWN THE SLOPE.

MULCHING: MULCH ALL DISTURBED AREAS WITH 2 TONS OF HAY OR STRAW PER ACRE (90 - 100#/1,000 SQ. FT.).
ANCHOR ON ALL SLOPES 3:1 OR STEEPER AND ON FLATTER SLOPES SUBJECT TO WASH (WATERWAYS AND/OR WINDBLOWN) USING JUTE (OR OTHER BIODEGRADABLE) NETTING OR EROSION CONTROL BLANKET, STAKING, AND STAPLING.

MAINTENANCE: INSPECT SEEDED AREAS FOR FAILURE AND MAKE NECESSARY REPAIRS AND RESEED IMMEDIATELY. CONDUCT A FOLLOW-UP SURVEY AFTER ONE YEAR AND REPLACE FAILED PLANTS WHERE NECESSARY. IF VEGETATIVE COVER IS INADEQUATE TO PREVENT EROSION, OVERSEED AND FERTILIZE IN ACCORDANCE WITH SOIL TEST RESULTS. IF A STAND HAS LESS THAN 40% COVER, REEVALUATE CHOICE OF PLANT MATERIALS AND QUANTITIES OF LIME AND FERTILIZER. RE-ESTABLISH THE STAND FOLLOWING SEEDBED PREPARATION AND SEEDING RECOMMENDATIONS, OMITTING LIME AND FERTILIZER IN THE ABSENCE OF SOIL TEST RESULTS. IF THE SEASON PREVENTS RESOWING, MULCH OR (7. CONT.) JUTE NETTING IS AN EFFECTIVE TEMPORARY COVER. SEEDED AREAS SHOULD BE FERTILIZED DURING THE SECOND GROWING SEASON. LIME AND FERTILIZE THEREAFTER AT PERIODIC INTERVALS, AS NEEDED.

8. TEMPORARY EROSION CONTROL MEASURES SHALL NOT BE REMOVED UNTIL ALL DISTURBED AREAS HAVE BEEN STABILIZED.

9. MAINTENANCE: DURING THE CONSTRUCTION PERIOD AND UNTIL SUCH TIME AS THE LONG TERM VEGETATION IS ESTABLISHED TO A 70% VEGETATIVE STAND.
A. DISTURBED AREAS WILL BE FERTILIZED AND RESEEDED.
B. CATCH BASINS AND FILTER BAGS WILL BE CHECKED AND CLEANED AS NECESSARY.
C. DRAINAGE AND GRASS TREATMENT SWALES SHALL BE CHECKED FREQUENTLY AND CLEANED AS REQUIRED.
D. THE SILT FENCES WILL BE CHECKED ON A REGULAR BASIS AND REPAIRED AS NECESSARY TO CORRECT ANY DAMAGE, DETERIORATION, AND SHORT-CIRCUITING.

10. REFER TO "GRADING PLANS" FOR THIS PROJECT PRIOR TO ANY SITE DISTURBANCE.

11. INSPECTIONS: THE ENGINEER SHALL BE CONTACTED ON A REGULAR BASIS TO INSPECT ALL EROSION CONTROL PRACTICES AS WELL AS THE MAINTENANCE OF THE EROSION CONTROL COMPONENTS. REFER TO CONSTRUCTION SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. EROSION CONTROL PRACTICES SHALL BE IN STRICT ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS.

12. THE MAXIMUM AMOUNT OF AREA TO BE DISTURBED AND UNSTABLIZED SHALL BE 5 ACRES AT ANY ONE TIME.

13. THE MAXIMUM AMOUNT OF TIME ANY AREA MAY BE DISTURBED WITHOUT STABILIZATION SHALL BE 14 DAYS.

CONSTRUCTION SEQUENCE

1. INSTALL INLET PROTECTION/FILTER BAGS AT ALL LOCATIONS INDICATED ON PLAN OR AT OTHER LOCATIONS AS DETERMINED BY ENGINEER. INSTALL OTHER TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL MEASURES AS EARTHWORK PROCEEDS.

2. CONTRACTOR SHALL LEGALLY DISPOSE OF ALL SURPLUS UNCLASSFIED EXCAVATION AT AN APPROVED LOCATION NOTED IN THE SPECIFICATIONS.

3. REMOVE EXISTING PAVEMENT AND SUBBASE AS REQUIRED.

4. INSTALL NEW BASE AND SUBBASE.

5. INSTALL PAVEMENT LIGHTS AS REQUIRED.

6. PAVE NEW AREAS.

7. GRADE AREA AS SHOWN ON PLANS AND LOAM, FERTILIZE AND SEED AREAS TO ESTABLISH VEGETATION.

8. INSPECT ALL DISTURBED AREAS ON A DAILY BASIS. FOLLOWING THIS DAILY INSPECTION, INSTALL AS REQUIRED ANY AND ALL TEMPORARY DRAINAGE, EROSION, AND SEDIMENT CONTROL PRACTICES AS INDICATED, I.E., DIVERSION CHANNELS, BERMS, DRAINS, DITCHES, STONE DIKES, SILT FENCES, SEED AND MULCH OR OTHER PRACTICES AS RECOMMENDED AND SPECIFIED IN THE "CONNETICUT EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS".

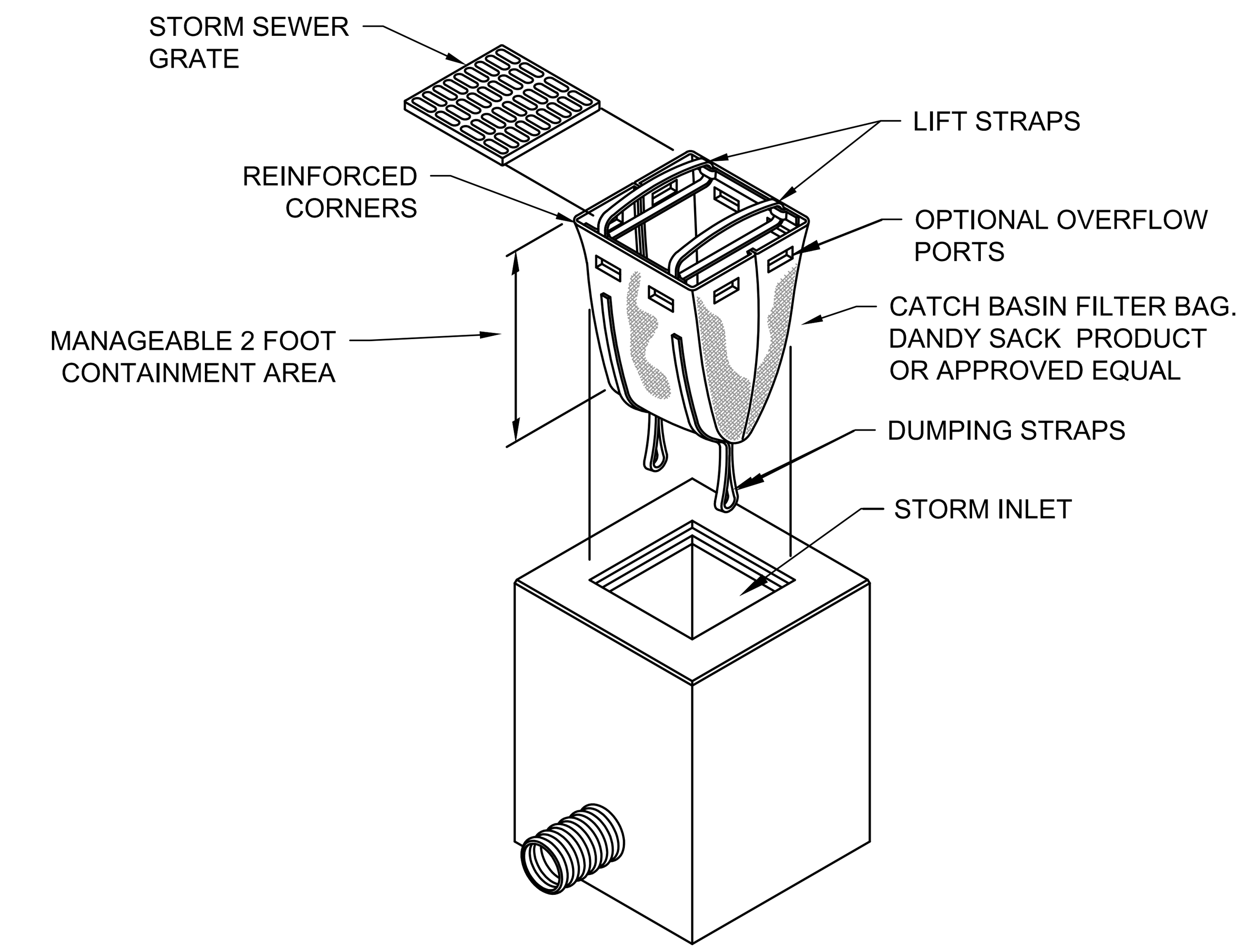
9. CLEAN AND RESTORE SILT DESTINATION SITES. REMOVE OTHER EROSION CONTROL PRACTICES ON A TIMELY BASIS AS PERMANENT MEASURES TAKE HOLD. SPOT FERTILIZE, SEED, AND MULCH AS REQUIRED.

10. INSPECT AND MAINTAIN GRADING, EROSION CONTROL AND SEDIMENT CONTROL PRACTICES WEEKLY AND IMMEDIATELY AFTER ALL SUBSTANTIAL STORMS.

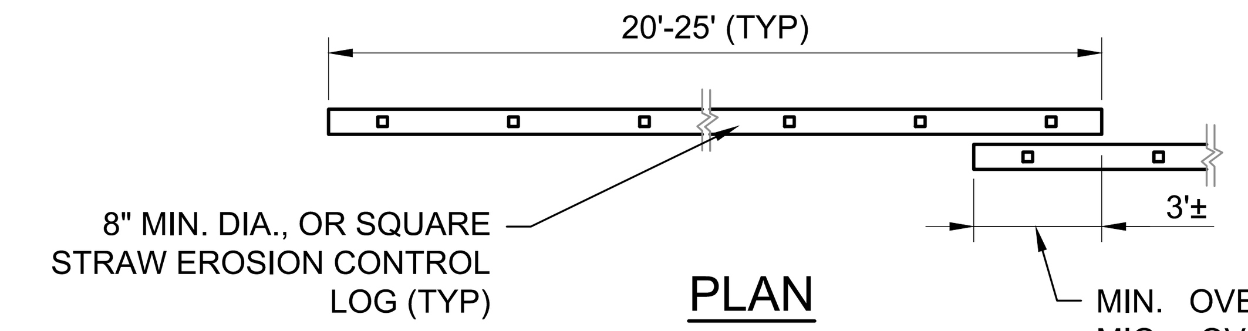
11. REFER TO "EROSION AND SEDIMENT CONTROL PLAN" FOR ADDITIONAL DETAILS RELATIVE TO THE REQUIRED CONSTRUCTION SEQUENCE. MAINTENANCE OF ALL EROSION CONTROL COMPONENTS SHALL BE AN ONGOING PRACTICE AND IN STRICT ACCORDANCE WITH THE APPROVED PLAN.

TABLE 1 – TEMPORARY UPLAND STABLIZATION PLANT SELECTION AND SEEDING RATES

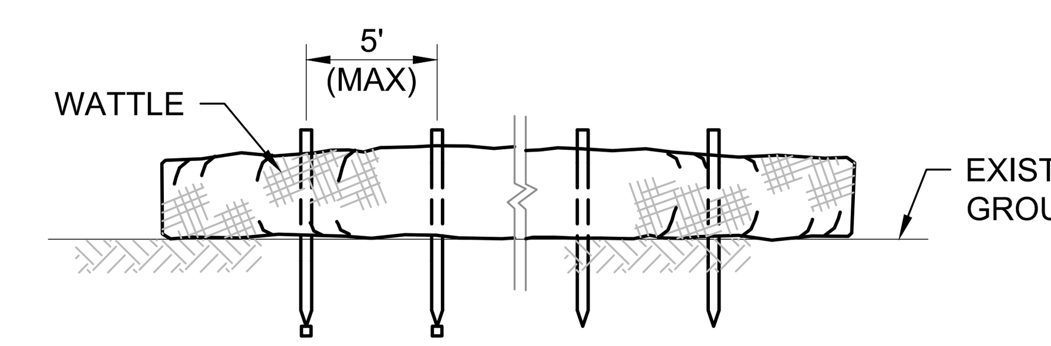
SPECIES	PER ACRE	PER 1000 SQ.FT.	REMARKS
WINTER RYE	120 LBS.	3 LBS.	BEST FOR FALL SEEDING. SEED AUGUST 15 TO OCTOBER 15 FOR BEST COVER. SEED TO DEPTH OF ONE TO 1 1/2 INCHES.
OATS	2 1/2 BU OR 80 LBS.	2 LBS.	BEST FOR SPRING SEEDINGS. SEED BETWEEN APRIL 1 TO JULY 1 OR AUGUST 15 TO SEPTEMBER 15. SEED TO DEPTH OF ONE INCH.
ANNUAL RYE	40 LBS.	1 LB.	GROWS QUICKLY. BUT IS OF SHORT GRASS DURATION USE WHERE APPEARANCES ARE IMPORTANT. COVER SEED WITH NO MORE THAN 1/4 INCH OF SOIL. WITH MULCH, SEEDING MAY BE DONE THROUGHOUT GROWING SEASON. SEED BETWEEN APRIL 1 AND JUNE 1 OR AUGUST 15 & SEPTEMBER 15.
FOXTAIL MILLET	30 LBS.	0.7 LB.	MAY 1 TO JUNE 30. SEED TO DEPTH OF 1/2 TO 3/4 INCH.



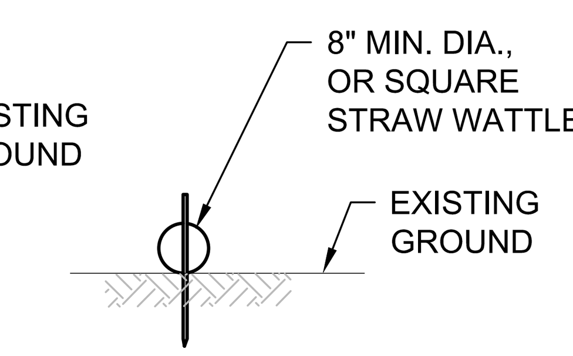
INLET PROTECTION (FILTER BAG) INSTALLATION
NOT TO SCALE
(ITEM C-102-5.2)



PLAN

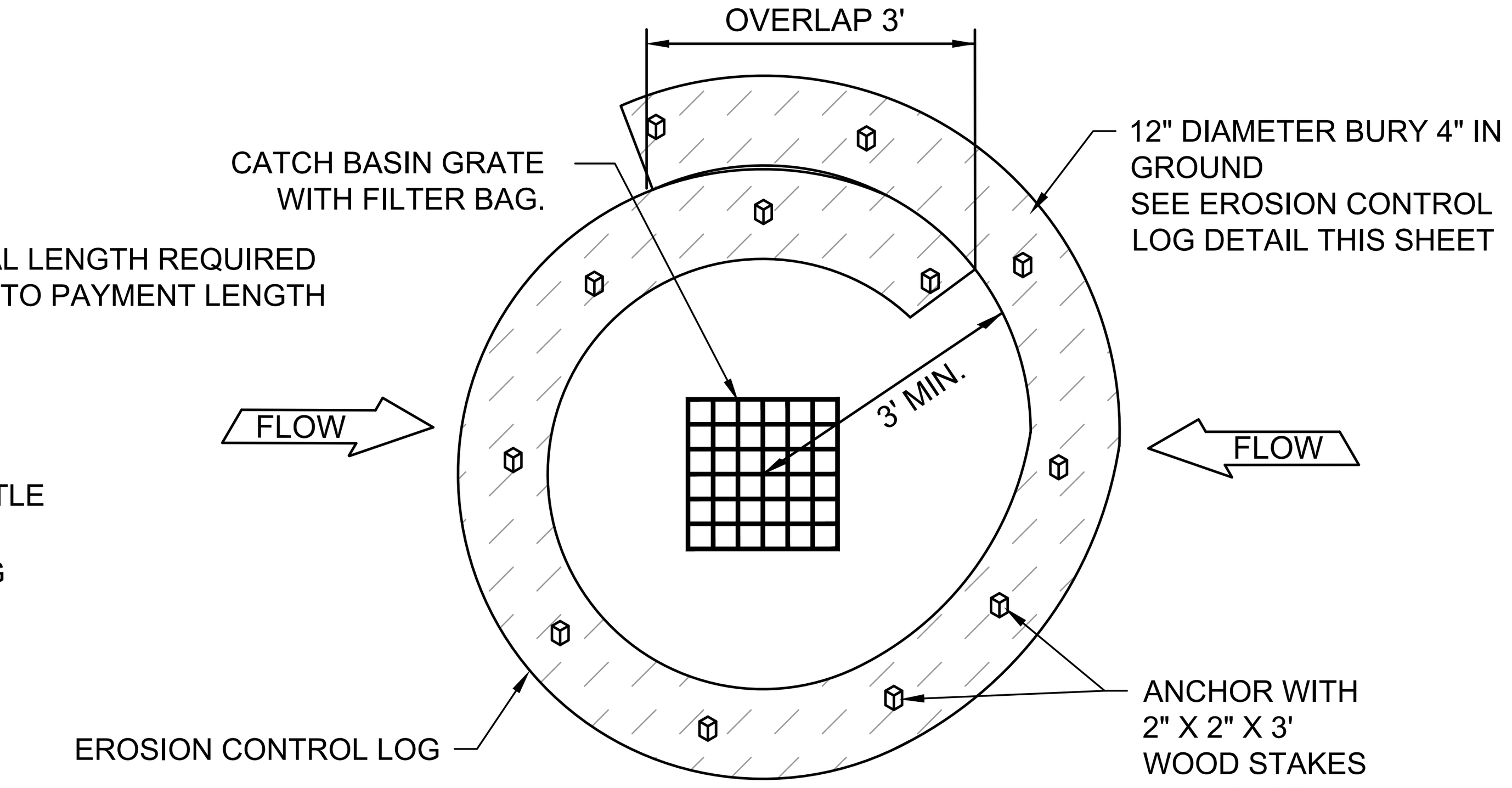


ELEVATION



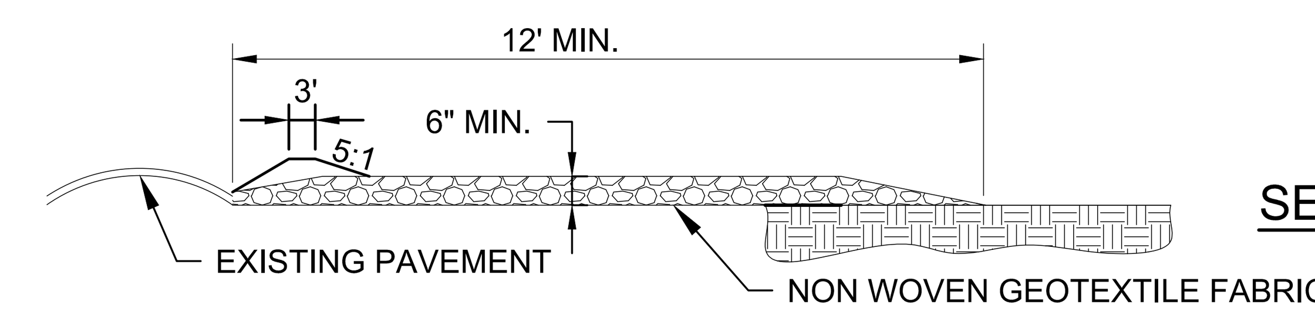
SECTION

EROSION CONTROL LOG
NOT TO SCALE
(ITEM C-102-5.1)

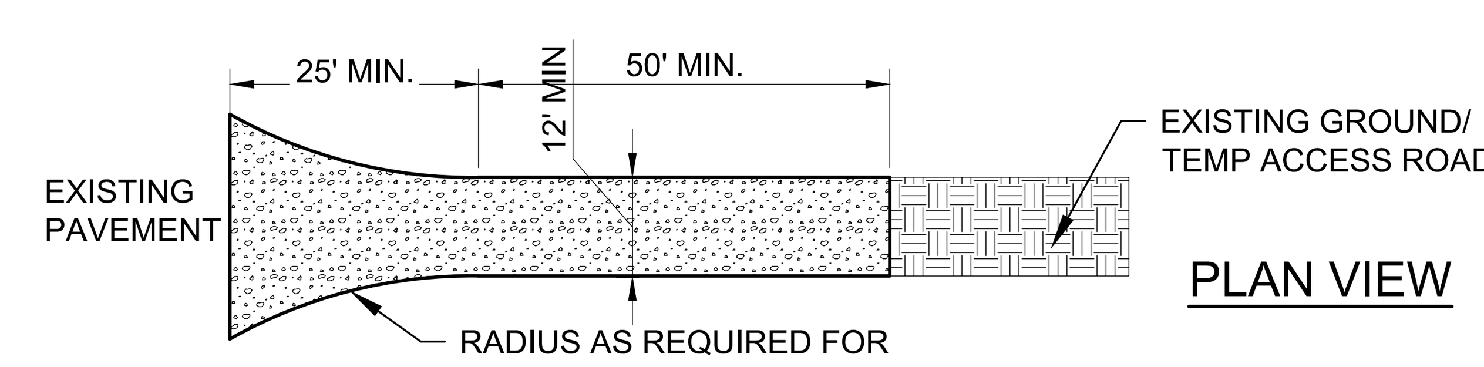


PLAN VIEW

INLET PROTECTION
NOT TO SCALE
(ITEM C-102-5.1, C-102-5.2)



SECTION



PLAN VIEW

STABILIZED CONSTRUCTION ENTRANCE DETAIL
NOT TO SCALE
(ITEM C-102-5.3)

STABILIZED CONSTRUCTION ENTRANCE NOTES:

1. STONE SIZE-USE 1"-3" STONE, RECLAIMED OF RECYCLED CONCRETE EQUIVALENT
2. LENGTH - NOT LESS THAN 50 FEET.
3. THICKNESS - NOT LESS THAN 8".
4. WIDTH - 12' MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. 24' IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE MUST BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON A AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED ACCORDING TO PERMIT REQUIREMENTS.

BID DOCUMENTS

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STATE OF CONNECTICUT · BRIAN M. BENNETT · 28080 · LICENSED · PROFESSIONAL ENGINEER

REV	DATE	DESCRIPTION	BY

McFarland Johnson
53 REGIONAL DRIVE
CONCORD, NEW HAMPSHIRE 03301

BRADLEY INTERNATIONAL AIRPORT
WINDSOR LOCKS, CONNECTICUT

CONSTRUCT TAXIWAY E

EROSION CONTROL DETAILS

SCALE: NTS	DESIGN: SSS		
DRAWN: BRF	PROJECT: 18621.04	EC-01
CHECKED: BMB	DATE: MARCH 2021	45 OF 98