Success Stories

Climate Forum 2020

The Town of Deerfield hosted a very successful and well-attended townwide forum on "Climate Resiliency: Deerfield 2030" on Saturday, February 29, 2020 at the Frontier Regional High School, with over 30 speakers and over 150 participants.

The goal of this forum was to inform and motivate residents about actions that they can take that will make a difference on climate change and climate resiliency. The forum featured workshops on a wide variety of topics including:

- Understanding Climate Change and Its Impacts
- Homeowner Strategies for Reducing Carbon Footprint
- Forestland Management and Wildlife Impacts in a Changing Climate
- Moving Toward Net Zero or Zero Energy Buildings
- Student Activities to Address Climate Change
- Climate Resiliency for Farming Activity
- Green Infrastructure and Green Energy Strategies for Deerfield
- Design Charrette for Downtown Vision: Complete and Green Streets

Deerfield residents participate in town center design charrette as part of the 2020 Climate Forum at Frontier Regional School.

Construction of Replacement Culvert on Mill Village Road

The Mill Village Road culvert was listed as Deerfield's top priority culvert for replacement in the approved Deerfield Municipal Vulnerability Plan, due to danger of further collapse of the existing culvert and roadway. Mill Village Road was partially closed for years due to this ongoing problem. Design, engineering and permitting for this project were completed by engineering consultants Tighe and Bond Inc., and funded under a previous MVP Implementation grant.

The town contracted to construct a new open bottom culvert to replace a partially collapsed and vulnerable culvert on Mill Village Road (near Old Main Street in Old Deerfield over an unnamed tributary to the Deerfield River). This culvert was constructed with an open bottom culvert to improve flow and fish/wildlife passage, reduce flooding and protect public safety.

BEFORE: Collapsed culvert on Mill Village Road resulted in partial closure of the road.

DURING: Installation of the new Mill Village Road culvert.

AFTER: The new open bottom culvert at Mill Village Road is sized for climate change and designed to promote fish and wildlife passage.

The contractor successfully installed the replacement culvert for Mill Village Road. This project included the following components:

- Install erosion and sedimentation controls
- Install temporary road
- Install cofferdam
- Excavate and remove existing failed culvert
- Install three sided precast culvert and restore stream channel
- Remove cofferdam
- Restore site and pave road.
- Remove and restore temporary road.

Construction of Replacement Culvert on Kelleher Drive at Bloody Brook

This project included construction of a new open bottom culvert to replace an undersized and vulnerable culvert on Kelleher Drive (near North Main Street over Bloody Brook) with an open bottom culvert to improve flow and fish/wildlife passage, reduce flooding and protect public safety. It has been designed to promote climate resilience, and sized to reflect increased flood levels with climate change. It meets Massachusetts River and Stream Crossing Standards and is sized to accommodate the 100-year flood event. Typically culverts are designed to accommodate the 25-year design storm, but in this capacity was added to compensate for potential future climate change.

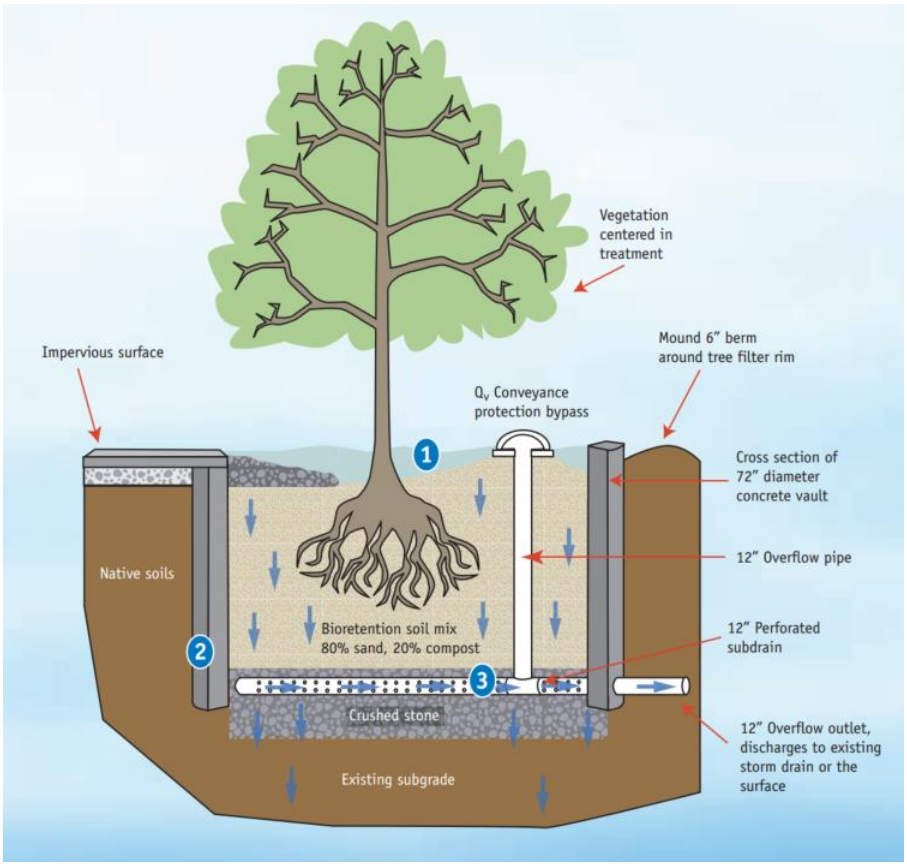
The Kelleher Drive culvert is listed as Deerfield's second priority culvert for replacement in the approved Deerfield Municipal Vulnerability Plan, and is a key vulnerability because it is a major contributor to the frequent flooding on Bloody Brook in Deerfield town center along North Main Street.

The Kelleher Drive replacement culvert was sized for increased flows expected with climate change and designed to promote fish and wildlife passage.

Based on engineering assessment, the existing culvert was showing signs of imminent failure (sinkholes in the road indicating the ceiling of the pipe has perforations), and was a significant restriction to upstream flow resulting in some significant localized flooding. The culvert needed immediate replacement and the Town prioritized replacement of the culvert before it completely failed. This area has frequent flooding problems and the new culvert size was enlarged from the current culvert.

Construction and Installation of Green Infrastructure in Deerfield Town Center and at Schools

Under a previous MVP grant, Deerfield completed engineering design plans for green infrastructure installations of tree box filters at five locations in the town center and one at the Elementary School, to promote climate resiliency and reduce flooding by reducing stormwater runoff from impervious areas. Bloody Brook in South Deerfield center has been subject to regular flooding that has impacted homes and impaired roads. The Bloody Brook area is a high risk area for mosquitos and mosquito-borne illnesses, located close to major school populations, so this task will also improve public safety in this area.



How a tree box filter works.

This project included the construction and installation of:

- Five tree box filters in South Deerfield town center (two on South Main Street, two on Elm Street, one on North Main Street);
- One tree box filter at the Elementary School;
- Two rain gardens at Deerfield Elementary School.

The tree box filter installations were placed in highly visible locations, and the new Japanese Lilac trees are attractive and green additions to the town center. Merchants and property owners were consulted in advance, participated in the design process, and are supportive of the installations.

Installed tree box filter on Elm Street with Japanese lilac tree.

Installed tree box filter at corner of Main and Elm Streets.

Two tree box filters on South Main Street.

One of two newly installed rain gardens at Deerfield Elementary School.

Design for Green Streets and Green Parking Lots in Town Center, Schools and Old Deerfield

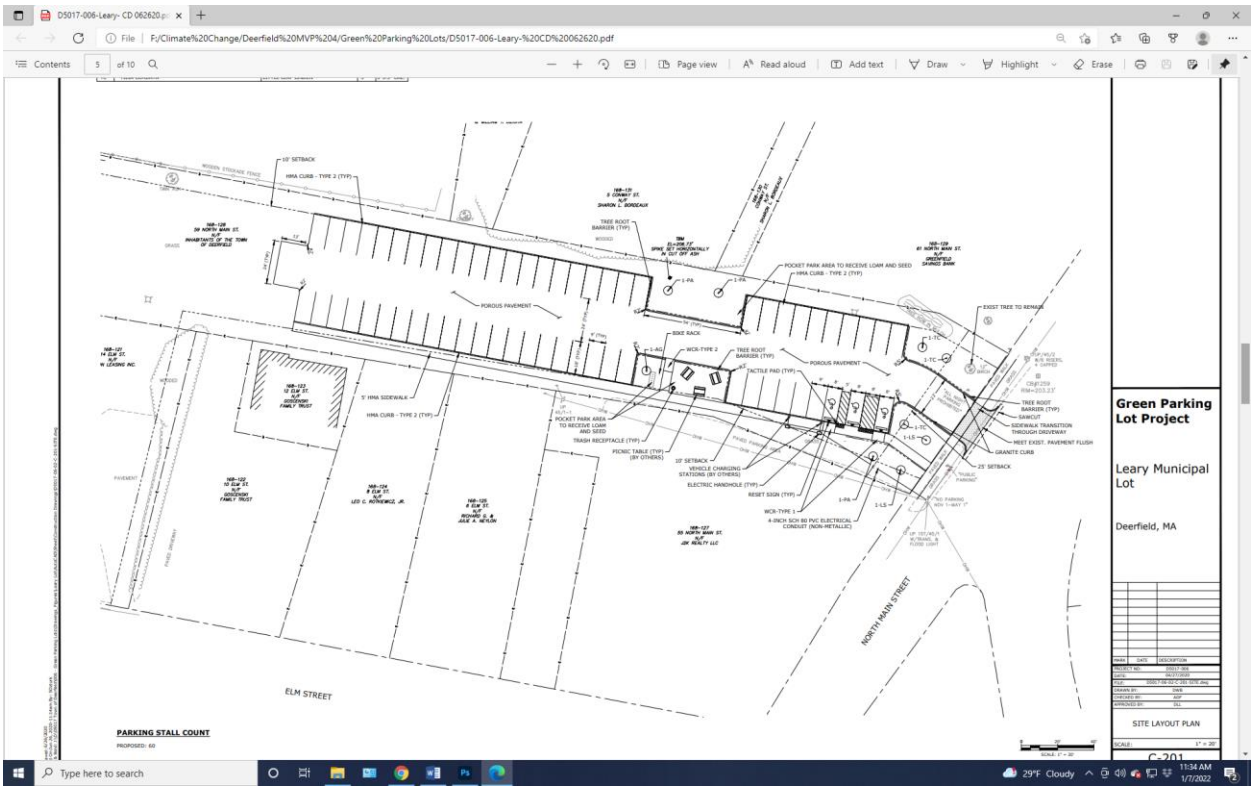
In addition to the green infrastructure construction projects, engineering design work was completed on several additional green infrastructure improvements to help reduce stormwater discharged from paved surfaces and consequently the town's flooding vulnerability from Bloody Brook and the Deerfield River.

Environmental engineers completed engineering design plans for the following green streets and parking improvements:

- Tree box filter installations at 4 sites on municipal streets or parking areas, including two at the Deerfield Elementary School entry area, and two near Deerfield Inn and the Visitor's Center in Old Deerfield;
- A rain garden to address street and parking lot runoff near the Historic Deerfield Visitor's Center;
- Nature-based drainage improvements and design for a new entryway at the Deerfield Elementary School.

Environmental engineers from Tighe and Bond completed engineering design plans for the following green streets and parking improvements:

- A new green parking lot at Frontier Regional High School that incorporates porous asphalt in the parking spaces, and rain gardens and infiltration trenches to recharge the remaining stormwater runoff;
- A new green municipal parking lot (the Leary Lot at 59 North Main Street) in the South Deerfield town center, with similar features as above.



Green parking lot design plans for the Leary lot in South Deerfield town center.

Green Infrastructure Policy for Town

The Selectboard has adopted a new Green Infrastructure Policy for the Town of Deerfield. This policy promotes the use of green street facilities and green infrastructure in public and private development through regulation, capital investment, and management mechanisms as a cost-effective and sustainable practice for stormwater management in current and future projects when technically and economically feasible. This includes road development and reconstruction, bicycle and pedestrian projects, stormwater projects, and other development and redevelopment.

The policy was drafted with input from Deerfield's MVP Core Group, and was recommended to the Selectboard for adoption by that group. The Selectboard formally adopted the policy on April 22, 2020. Deerfield has subsequently taken multiple steps to implement the new policy.

Evacuation Action Plan for Great River Hydro Emergencies

Great River Hydro operates a series of hydropower dams on the Deerfield River system. This company recently completed a set of inundation maps showing downstream areas that would be flooded in the event of a catastrophic failure of any of its dams. They also completed an emergency action plan with notification flow chart and electronic notification procedures to be employed in the event of a dam failure. The Great River Hydro EAP for Harriman Dam in Vermont, for example, notes that in the event of a catastrophic failure, Old Deerfield village, with its multiple private schools and popular historic tourism destination, would have 1.5 hours to evacuate before being hit by a massive wall of water. The EAP, however, does not go far enough to adequately prepare the town for this type of disaster, and further work is needed. It does not provide any details about how evacuations would be carried out, how student and public notification would occur, consider evacuation drills or address route closures.

Harriman Reservoir in Vermont

The town's MVP consultant and other school and town officials worked together to develop the "Flood Evacuation Action Plan for Old Deerfield Village" with implementation details for the EAP, including convening a task force meeting that includes officials from public safety directors from Deerfield Academy and Bement School, Historic Deerfield and Pocumtuck Valley Memorial Association, town emergency management officials to develop EAP implementation details for:

- Detailed Plans and Exercises for Evacuations
- Notification and Educational Tools for Affected Schools (Deerfield Academy and Bement) and other large employers (Historic Deerfield, Pocumtuck Valley Memorial Association)
- Notification and Educational Tools for All Residents on Town Website

The resulting Evacuation Action Plan will be incorporated into the next revision of Deerfield's MVP plan, and was widely disseminated to schools, and other involved groups.

Land Conservation in Deerfield River Floodplain

Deerfield has developed and formally adopted the "Land Conservation Plan for the Deerfield River Floodplain", for protecting key land parcels in the Deerfield River floodplain that contribute to the town's resiliency to flood impacts. The plan used criteria such as floodplain and floodway boundaries, flood storage capacity, wildlife habitat, buffering of vulnerable neighborhoods and schools, and others, to determine the most important land parcels to protect in Deerfield. The plan includes land conservation funding strategies to finance acquisition of key parcels, including private fundraising, grants and other strategies.

Floodplain land along the Deerfield River

Planning and Zoning for Climate Resiliency

Deerfield focused on planning and zoning for the community's future development that addresses the need to make buildings, roads and other infrastructure resilient to changing

weather conditions, flooding and other climate-related issues. This included encouraging nature-based solutions in design of development, and reducing stormwater runoff.

The Planning Board completed a comprehensive review of Deerfield's zoning bylaw and related town bylaws to identify areas where climate resiliency and carbon footprint reduction could be promoted in new development through changes in zoning and other bylaws. This review included drafting bylaw amendments to address nature based solutions for stormwater retention, reduction in flooding, heat island effect, reducing sprawl, reducing auto trip generation, tree planting, river protection, and promoting use of solar and other green energy sources.

The Planning Board did public outreach on draft bylaw changes, including public meetings and fact sheets describing the purpose of bylaw changes and their relationship to the towns' MVP plan.

The Planning Board developed several proposed zoning bylaw and subdivision regulation changes, including:

- Amendments to the town's Site Plan Review bylaw that will promote greener and more climate resilient design in new development in Deerfield, including cutting edge Green Development Performance Standards. These green standards address promoting passive solar building orientation, tree preservation, minimizing site disturbance, landscaping and water reduction, farmland protection, recycling, bicycle and pedestrian access and trip reduction. The regulations also provide incentives for new development to include features such as green roofs, permeable pavement, protected open space or wildlife habitat, or public parks.
- A completely new Solar zoning bylaw to streamline the process for building solar projects in Deerfield. This bylaw includes making small-scale and rooftop solar a by right use. There are also new standards to protect the town in the event that large-scale solar installations are abandoned.

Public Education on New Rave Alert System

Deerfield is transitioning from a Code Red alert system to a upgraded new Rave alert system for notifying town residents of emergencies. The Deerfield Emergency Management Director and other town officials prepared and mailed written fact sheets to all town residents to make them aware of the new system and how to use it. They prepared social media materials, press releases and information for the town website to inform the public of this new system. The materials developed also increased public understanding of climate change impacts within and beyond the community.

The new "Smart 911" system is now in place and Deerfield residents can sign up for notifications of emergencies on the town's website.