GREEN INFRASTRUCTURE MASTER PLANNING FOR STORMWATER-DRIVEN FLOODING HAZARDS

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PRESENTATION OVERVIEW

CLIMATE CONDITIONS + MVP

EASTHAMPTON OVERVIEW

GREEN INFRASTRUCTURE MASTER PLAN

CHERRY STREET PILOT PROJECT

OUTREACH + ENGAGEMENT

LESSONS LEARNED + TAKE AWAYS FOR YOUR COMMUNITY

RAINFALL INTENSITY

HURRICANES

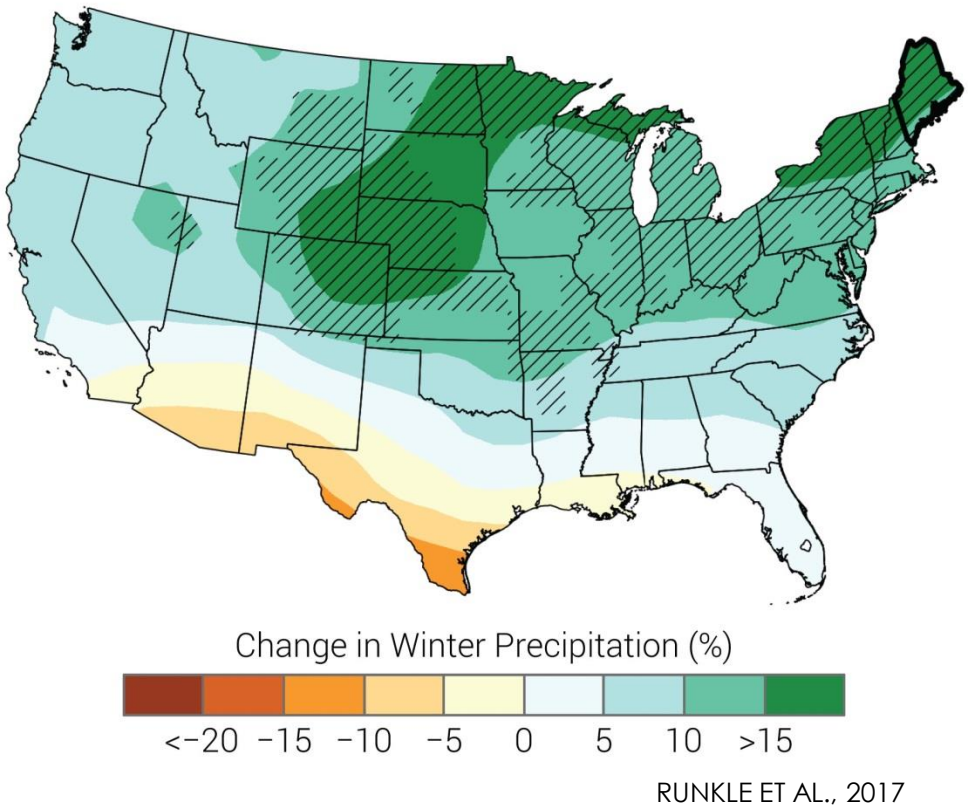
MORE FREQUENT & INTENSE

YEAR-ROUND STORM VULNERABILITY

TOTAL PRECIPITATION

WINTER AND SPRING

FLOOD RISK



CHANGING CLIMATE CONDITIONS

News

In case you haven't heard, Easthampton isn't up-and-coming anymore, it's officially a destination

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EASTHAMPTON, MA

HISTORY

DEMOGRAPHICS

GROWTH PATTERNS

ENVIRONMENTAL JUSTICE COMMUNITIES

INFRASTRUCTURE NEEDS + RESILIENCE

ENGAGE COMMUNITY → IDENTIFY **CLIMATE CHANGE** IMPACTS AND HAZARDS → ASSESS VULNERABILITIES & STRENGTHS → DEVELOP & PRIORITIZE ACTIONS → **TAKE ACTION**

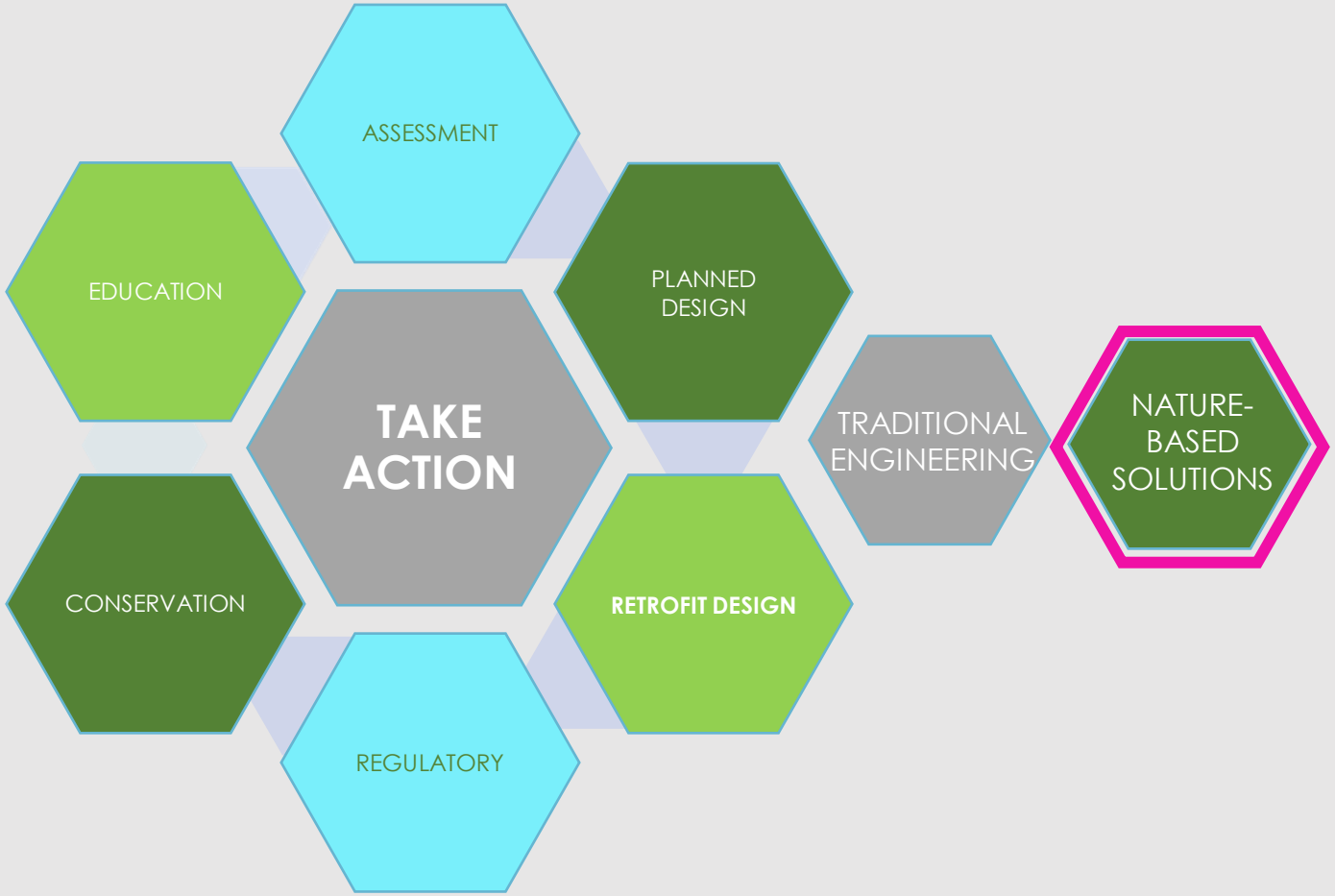


Photo courtesy of Alex Hackman, MADER

MASSACHUSETTS MVP PROGRAM

NATURE-BASED SOLUTIONS

GREEN INFRASTRUCTURE

IMPROVED WATER QUALITY

REDUCED POLLUTANTS IN STORMWATER RUNOFF

REDUCES PEAK FLOWS DURING STORMS

HELPS SUSTAIN STREAM FLOW DURING DROUGHTS

MITIGATES FLOODING & INCREASES FLOOD RESILIENCY

REDUCES STREAMBANK EROSION

EASIER TO MAINTAIN THAN UNDERGROUND PIPES

IMPROVES AIR QUALITY

SEQUESTERS CARBON

HELPS REDUCE ENERGY CONSUMPTION

ADDS AESTHETIC INTEREST

IMPROVES PROPERTY VALUES

CONTRIBUTES TO OVERALL ECONOMIC VITALITY

PROMOTES ADAPTATION TO CLIMATE CHANGE

COTTAGE STREET PARKING LOT

NEW CITY RIGHT OF WAY

PARSONS STREET PARK

NATURE-BASED SOLUTIONS

AUDIENCE

RESIDENTS

CITY COUNCIL

MAYOR

DPW

FUNDING AGENCIES

long-term solutions.
transformative futures.

CITY OF EASTHAMPTON
GREEN INFRASTRUCTURE MASTER PLAN

PREPARED BY FUSS&O'NEILL

MASTER PLAN GOALS

RELATABLE

GRAPHICS-FORWARD

ESTABLISH BUY-IN

PROACTIVE RESILIENCE STRATEGY

REPLICABLE

21 CONCEPT-LEVEL DESIGNS

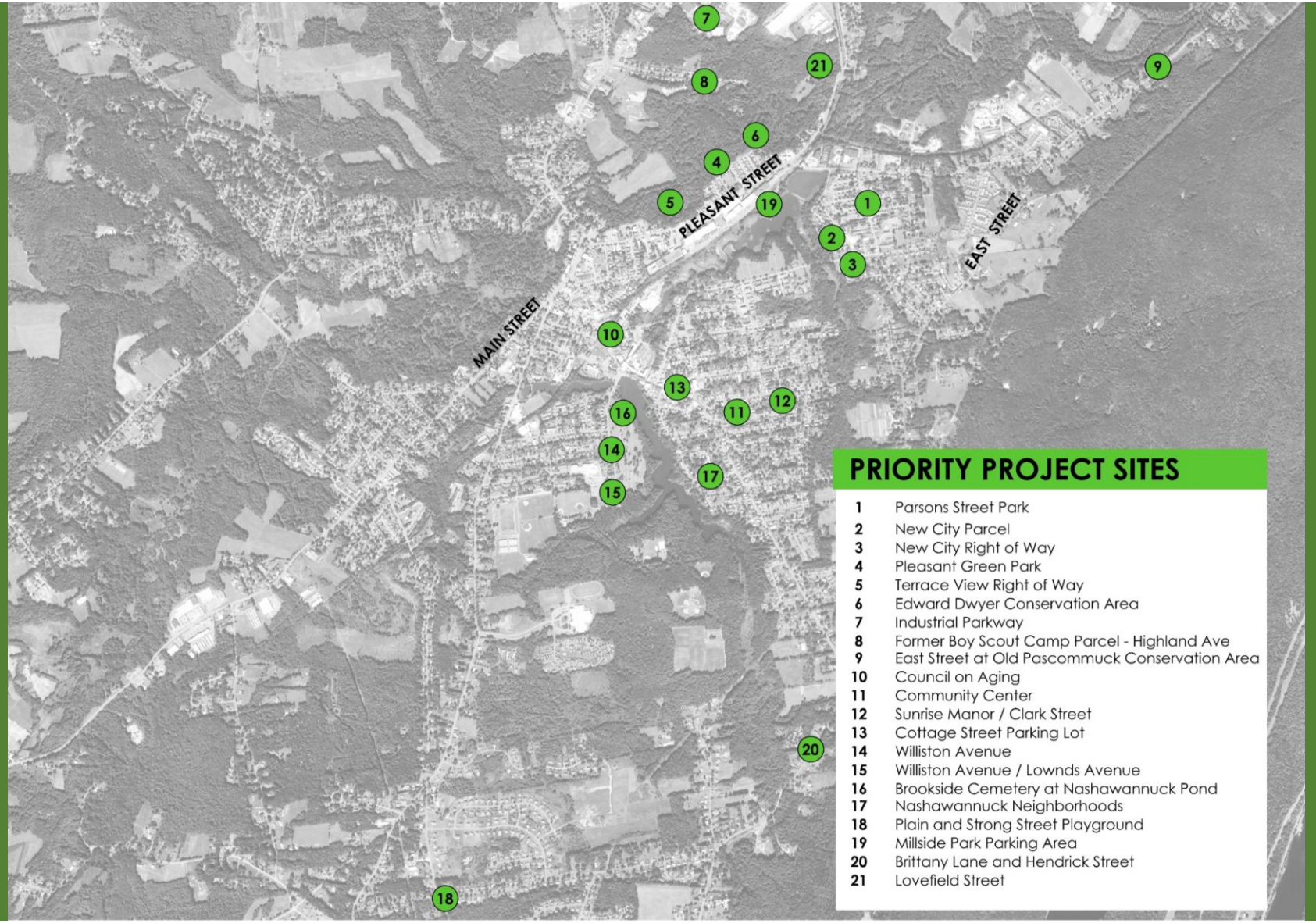
TO SUPPORT FUTURE IMPLEMENTATION PROJECTS

8 PLUG + PLAY DESIGN DETAILS

FOR LOW-MAINTENANCE GREEN INFRASTRUCTURE PRACTICES

POTENTIAL FUNDING SOURCES

FOR RECOMMENDED PROJECTS



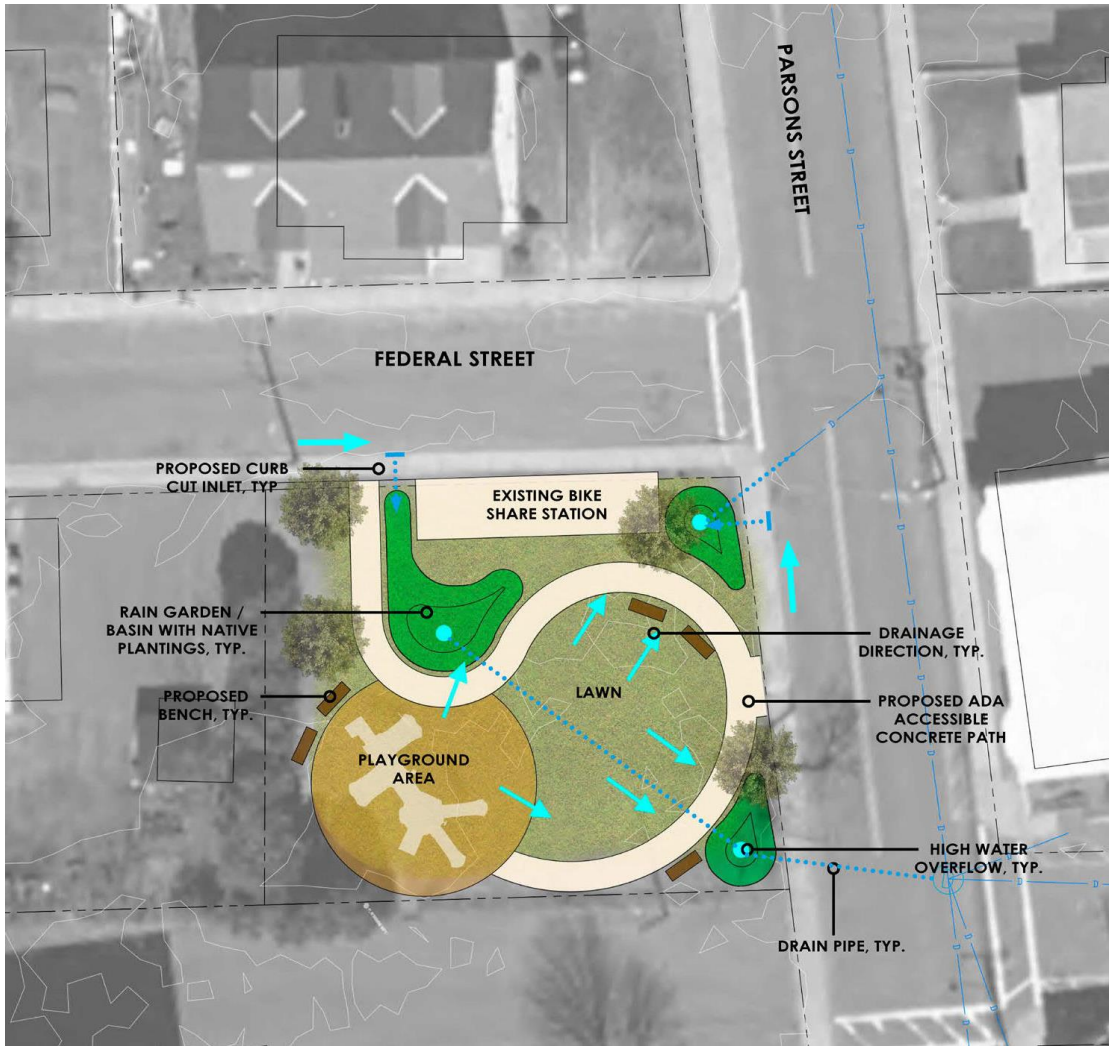
PRIORITY PROJECT SITES

1	Parsons Street Park
2	New City Parcel
3	New City Right of Way
4	Pleasant Green Park
5	Terrace View Right of Way
6	Edward Dwyer Conservation Area
7	Industrial Parkway
8	Former Boy Scout Camp Parcel - Highland Ave
9	East Street at Old Pascommuck Conservation Area
10	Council on Aging
11	Community Center
12	Sunrise Manor / Clark Street
13	Cottage Street Parking Lot
14	Williston Avenue
15	Williston Avenue / Lownds Avenue
16	Brookside Cemetery at Nashawannuck Pond
17	Nashawannuck Neighborhoods
18	Plain and Strong Street Playground
19	Millside Park Parking Area
20	Brittany Lane and Hendrick Street
21	Lovefield Street

PARSONS STREET PARK

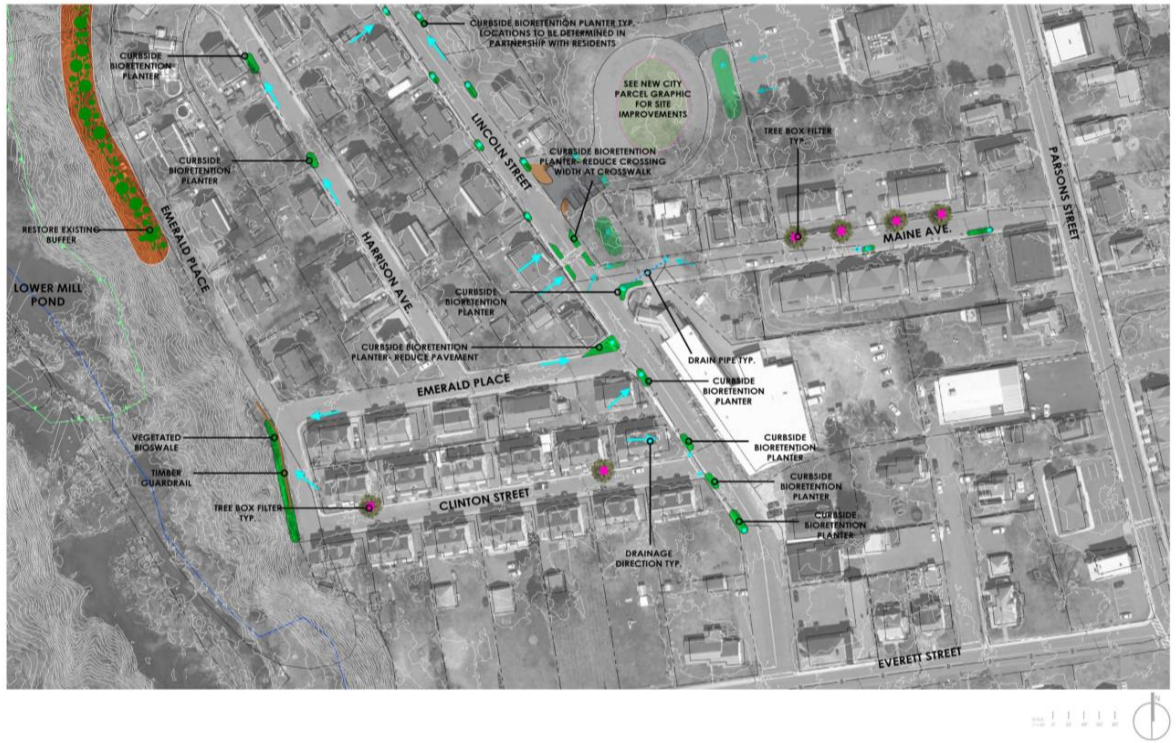
CONCEPT SUMMARY

IMPERVIOUS AREA TREATED	0.26 ACRES
DESIGN STORAGE VOLUME	930 CU FT
RUNOFF CAPTURE DEPTH	1 INCH
LONG-TERM POLLUTANT LOAD REDUCTIONS	TSS: 100% PHOSP: 92% NITROG: 98% BACT: 93%
PLANNING-LEVEL COST ESTIMATES	$130K



GREEN INFRASTRUCTURE MASTER PLAN | SITE-SPECIFIC CONCEPTS

3. New City Right of Way



GREEN INFRASTRUCTURE MASTER PLAN | NEIGHBORHOOD-SCALE CONCEPTS

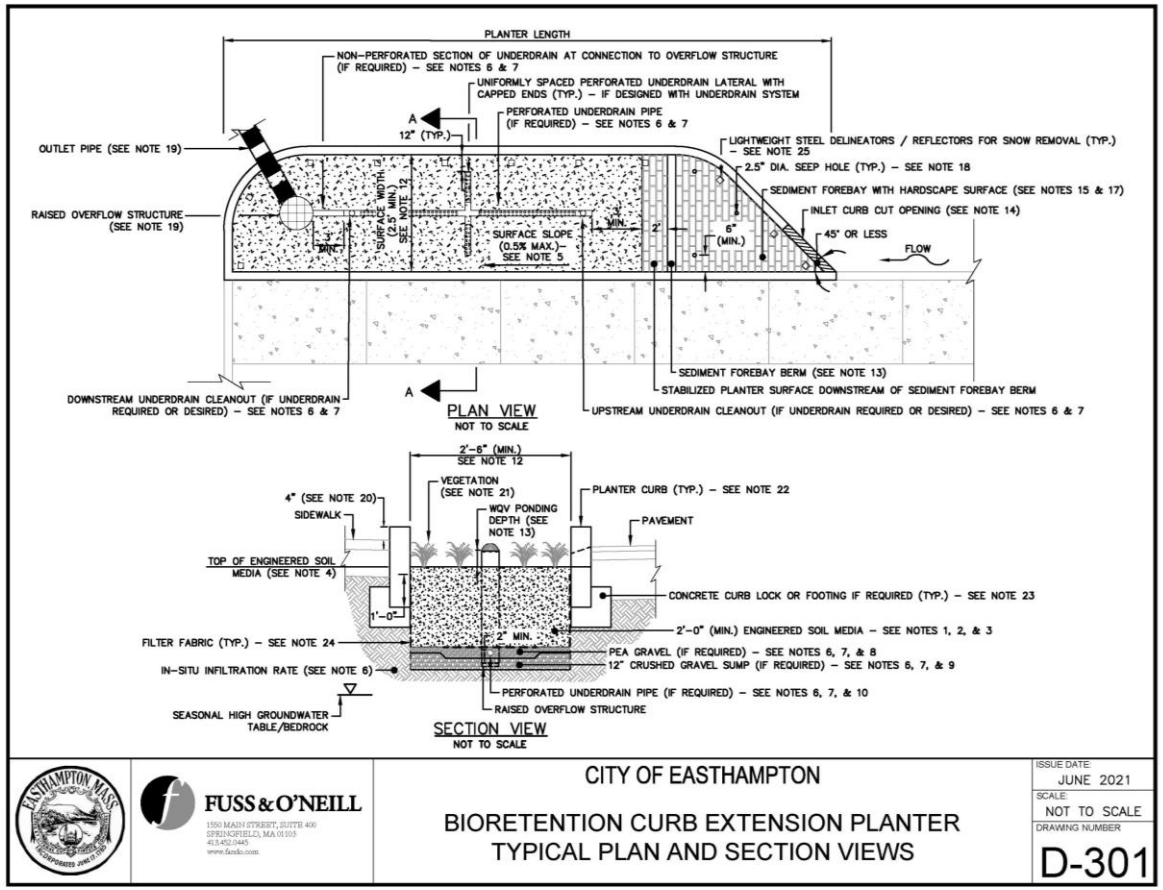
VISIONING

"TRANSLATION" PROCESS

CO-BENEFITS

PUBLIC BUY-IN

NEW CITY RIGHT OF WAY



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CITY OF EASTHAMPTON

BIORETENTION CURB EXTENSION PLANTER
TYPICAL PLAN AND SECTION VIEWS

ISSUE DATE: JUNE 2021
SCALE: NOT TO SCALE
DRAWING NUMBER: D-301

BIORETENTION PARKING LANE ADJACENT PLANTER NOTES:

1. ENGINEERED SOIL MEDIA SHALL HAVE A LOAMY SAND SOIL TEXTURE PER USDA TEXTURAL TRIANGLE. THE SOIL MIXTURE SHALL BE 60 – 70% OF SAND BY VOLUME; 15 – 25% OF TOPSOIL OR LOAM BY VOLUME; AND 15 – 25% OF ORGANIC MATTER (CONSISTING OR PARTIALLY DECOMPOSED SPHAGNUM PEAT WITH 100% PASSING A ¼" SIEVE, AND A PH OF 3.4 TO 4.8; OR GROUND PINE BARK MULCH) BY VOLUME, WITH A MAXIMUM SILT AND CLAY CONTENT OF 8%.
2. ENGINEERED SOIL MEDIA SHALL HAVE A DEPTH OF 24 INCHES TO 48 INCHES AS NECESSARY TO ACCOMMODATE THE WATER QUALITY VOLUME (WQV) AND SUBSURFACE CONDITIONS.
3. ENGINEERED SOIL MEDIA AND ASSOCIATED SUBGRADE SHALL NOT BE COMPACTED.
4. THE TOP OF THE ENGINEERED SOIL MEDIA LAYER MUST BE AT LEAST 36" ABOVE THE SEASONAL HIGH GROUNDWATER TABLE (SHGT) OR THE SURFACE OF THE ENGINEERED SOIL MEDIA (INCLUDING THE PEA GRAVEL SUMP AND CRUSHED GRAVEL SUMP IF PRESENT) MUST BE AT OR ABOVE THE SHGT; WHICHEVER IS GREATER.
5. THE SURFACE OF BIORETENTION PARKING LANE ADJACENT PLANTERS SHALL BE LEVEL OR HAVE A MAXIMUM SLOPE OF 0.5% TO PROMOTE INFILTRATION AND EVEN FLOW DISTRIBUTION. BIORETENTION PARKING LANE ADJACENT PLANTERS INSTALLED IN SLOPED AREAS MAY BE TERRACED TO ACHIEVE A LEVEL SURFACE. BIORETENTION PLANTERS MAY BE DESIGNED WITH SURFACE SLOPES GREATER THAN 0.5% IF DESIGNED WITH CHECK DAMS.
6. IN-SITU INFILTRATION RATES MUST EXCEED 0.17 INCHES/HOUR TO BE DESIGNED AS AN INFILTRATION PLANTER WITH NO UNDERDRAIN SYSTEM. IF IN-SITU INFILTRATION RATES ARE LESS THAN 0.17 INCHES/HOUR, INSTALL UNDERDRAIN SYSTEM AND DESIGN PLANTER TO ACHIEVE PARTIAL INFILTRATION. IMPERMEABLE LINERS (NOT SHOWN) ARE REQUIRED WHEN ADEQUATE SEPARATION TO SEASONAL HIGH GROUNDWATER TABLE (SHGT)/BEDROCK CANNOT BE ACHIEVED, SOILS ARE CONTAMINATED, OR HORIZONTAL SETBACK REQUIREMENTS CANNOT BE ACHIEVED.
7. PERFORATED UNDERDRAIN, PEA GRAVEL, AND CRUSHED GRAVEL SUMP ARE OPTIONAL FOR INFILTRATION BIORETENTION PLANTERS BUT ARE REQUIRED FOR FLOW-THROUGH BIORETENTION PLANTERS.
8. PEA GRAVEL, IF REQUIRED, SHALL CONSIST OF ¾" TO ¾" SIZE CLEAN, WASHED GRAVEL CONFORMING TO THE GRADATION OF SUBSECTION M2.01.4 OF THE MASSDOT STANDARDS. ADDITIONALLY, D_{15} (OF PEA GRAVEL) ≤ $5D_{85}$ (OF ENGINEERED SOIL MEDIA) AND D_{50} (OF PEA GRAVEL) ≤ $25D_{50}$ (OF ENGINEERED SOIL MEDIA).
9. CRUSHED GRAVEL SUMP STONE MATERIAL, IF REQUIRED, SHALL BE CLEAN, WASHED STONE AND SHALL MEET THE GRADATION OF SUBSECTION M2.01.4 OF THE MASSDOT STANDARDS.
10. WHEN PLANTER IS INSTALLED WITH AN UNDERDRAIN, THE UNDERDRAIN MUST BE INSTALLED WITH A MINIMUM OF 2" OF PEA GRAVEL ABOVE AND BELOW THE UNDERDRAIN FOR A DISTANCE OF 12" ON BOTH SIDES.
11. IMPERMEABLE LINER, IF REQUIRED, SHALL BE A 30 MIL (MINIMUM) HDPE OR PVC LINER.
12. THE PREFERRED WIDTH OF THE BIORETENTION PARKING LANE ADJACENT PLANTER SHALL BE 4.0 FEET. HOWEVER, NARROWER PLANTERS MAY BE ALLOWED WITH WIDTHS NO LESS THAN 2.5 FEET. ONLY INSTALL TREES IN PLANTERS WITH WIDTHS OF 4 FEET OR GREATER.
13. THE PONDING DEPTH FOR THE WATER QUALITY VOLUME (WQV) MAY VARY BETWEEN 6" AND 12".
14. EVERY BIORETENTION PLANTER MUST HAVE AN INLET OPENING FOR INFLOW. INLET OPENING OPTIONS MAY INCLUDE INLET CURB CUT OPENINGS, INLET STRUCTURES, PIPED FLOW ENTRANCES, AND FLOW DIVERSION STRUCTURES.
15. SEDIMENT FOREBAY PRETREATMENT OPTION SHOWN. PRETREATMENT OPTIONS INCLUDE: SEDIMENT FOREBAYS, DEEP-SUMP CATCH BASINS, PROPRIETARY FLOW THROUGH TREATMENT DEVICES, AND GRASS CHANNELS.
16. SEDIMENT FOREBAY BERM OPTIONS INCLUDE: GABION BASKETS, CONCRETE OR GRANITE CURBING, AND PRECAST OR CAST-IN-PLACE CONCRETE WEIRS.
17. SEDIMENT FOREBAY SURFACE SHALL CONSIST OF A HARDSCAPE SURFACE SUCH AS CONCRETE, GROUTED STONE, OR OTHER MATERIAL SUBJECT TO DEPARTMENT APPROVAL IN ORDER TO FACILITATE MAINTENANCE.
18. PROVIDE AT LEAST TWO WEEP HOLES (2.5 INCHES IN DIAMETER) FOR EVERY 25 SQUARE FEET OF SURFACE AREA IN THE SURFACE OF THE FOREBAY TO FACILITATE LOW LEVEL DRAINAGE.
19. RAISED OVERFLOW STRUCTURE OPTION IS SHOWN. EVERY BIORETENTION PLANTER MUST HAVE A PROVISION FOR OVERFLOW. OPTIONS MAY INCLUDE OUTFLOW CURB CUT OPENINGS, SINGLE-STAGE OR MULTI-STAGE RAISED OVERFLOW STRUCTURES, STABILIZED SPILLWAYS/OVERFLOW WEIRS, OR OUTLET PIPES/CULVERTS.
20. PLANTERS EXCEEDING 12" IN DEPTH BETWEEN ADJACENT SIDEWALK/GROUND SURFACE MUST BE DESIGNED WITH LOW-HEIGHT BARRIERS SUCH AS RAISED 4-INCH HIGH CURBING, EDGING, OR LOW FENCING LESS THAN 24-INCHES TALL. PLANTERS WITH DROPS OF MORE THAN 30" MUST BE DESIGNED IN ACCORDANCE WITH ADA STANDARDS FOR RAILING SYSTEMS/BARRIER.
21. LEVEL STEP-OUT ZONE SHALL BE A MINIMUM OF 3' WIDE. LEVEL STEP-OUT ZONE MAY BE REDUCED TO 12"-18" WHERE PLANTERS ARE LESS THAN 20-FEET LONG AND REGULAR 5-FOOT WIDE PEDESTRIAN CUT-THROUGH PATHS ARE PROVIDED, AND THE STEP-OUT ZONE IS NOT PART OF AN ADA ACCESSIBLE ROUTE.
22. PEDESTRIAN CUT-THROUGHS SHALL HAVE A MINIMUM WIDTH OF 5 FEET.
23. VEGETATION INSTALLED WITHIN BIORETENTION PLANTERS IN MEDIANS, NEAR INTERSECTIONS, OR NEAR PEDESTRIAN CROSSINGS SHALL REACH A MATURE HEIGHT OF NO GREATER THAN 24-INCHES ABOVE THE SURROUNDING SIDEWALK OR PAVEMENT SURFACE.
24. CURB SHALL BE IN ACCORDANCE WITH SECTION 501 OF THE MASSDOT STANDARD SPECIFICATIONS. CURB BURIAL DEPTH, SPACING FOR LATERAL BRACING, OR CURB FOUNDATION SHALL BE DETERMINED THROUGH SITE SPECIFIC DESIGN AND EVALUATION OF EXISTING SOIL CONDITIONS.
25. CONCRETE CURB LOCK SHALL BE IN ACCORDANCE WITH SECTION 901 OF THE MASSDOT STANDARD SPECIFICATIONS.
26. FILTER FABRIC SHALL BE NON-WOVEN, ON THE MASSDOT QUALIFIED CONSTRUCTION MATERIALS LIST, AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
27. LIGHTWEIGHT STEEL DELINEATORS/REFLECTORS FOR SNOW REMOVAL SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. MATERIALS SHALL CONFORM TO SECTION 828 OF THE MASSDOT STANDARD SPECIFICATIONS AND THE LATEST EDITION OF THE MANUAL UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

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CITY OF EASTHAMPTON

BIORETENTION PARKING LANE ADJACENT PLANTER
TYPICAL NOTES

ISSUE DATE: JUNE 2021
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DRAWING NUMBER: D-202

GREEN INFRASTRUCTURE MASTER PLAN | STANDARD ENGINEERING DETAILS

CHERRY STREET OUTFALL

FAILED OUTFALL + CLIMATE IMPACTS

SIGNIFICANT EROSION

HIGHLY VISIBLE LOCATION

CHERRY STREET EXISTING CONDITIONS

CHERRY STREET EXISTING CONDITIONS

CHERRY STREET GREEN INFRASTRUCTURE RENDERING

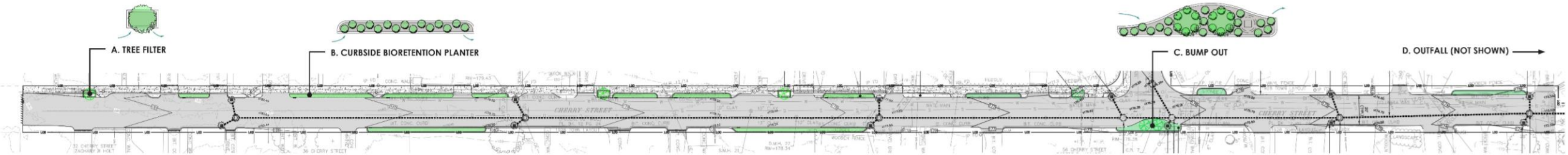
PILOT PROJECT NEXT STEPS

CONSULTANT PARTNERSHIP

LEVERAGING STATE + FEDERAL $

Gov. Baker visits Easthampton to announce Municipal Vulnerability Preparedness Grant awards

IMPLEMENTATION | PILOT PROJECT



TAKING IT TO THE STREETS

- PLANTER LAYOUT EVENT
- PLANT SELECTION EVENT
- VIRTUAL SCHOOL FIELD TRIP
- HOMEOWNER'S DIY GUIDE + MAINTENANCE GUIDE

PUBLIC ENGAGEMENT + PROJECT RECEPTION

TAKE HOME LESSONS

FIRST STEP | PILOT PROJECT

VALUE OF A MULTI-FACETED APPROACH

HOW OUR PROCESS DIFFERED FROM A TYPICAL PROJECT

WHAT WORKED + TIPS FOR SUCCESS IN YOUR COMMUNITY

QUESTIONS?

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