CLEAR

Center for Land Use Education & Research

FINDING RETROFITS IN THE TOWN OF FAIRFIELD

PARKING LOT DISCONNECTION CASE STUDY

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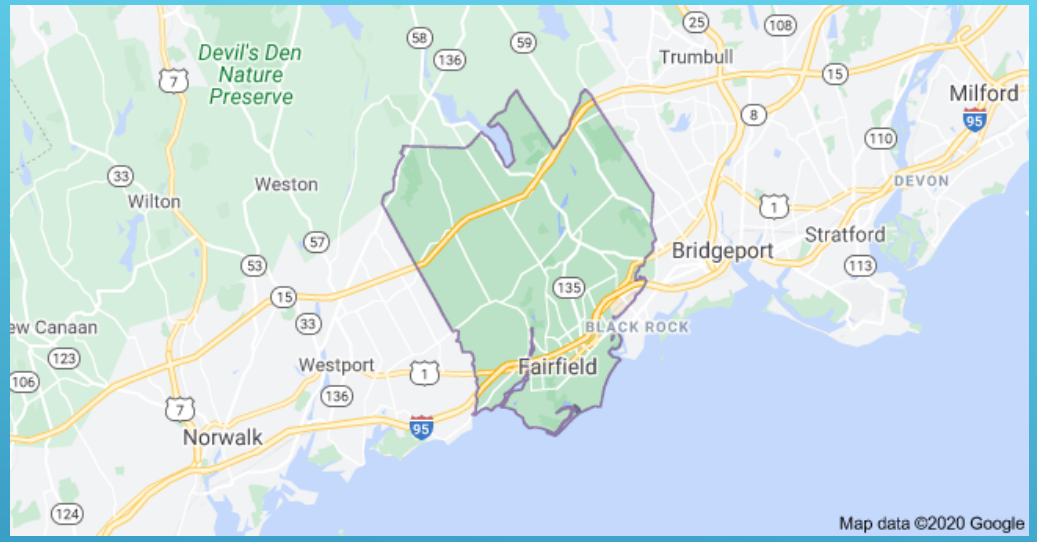
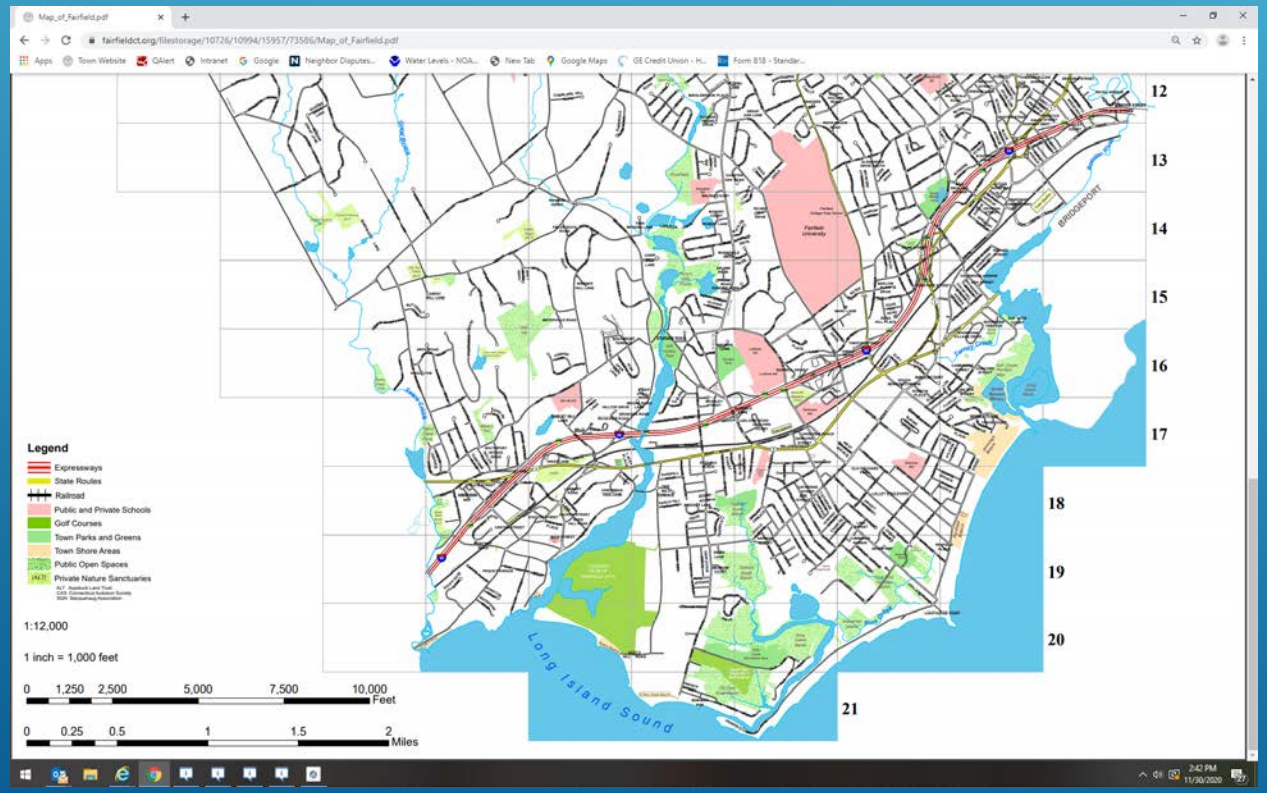
DECEMBER 9, 2020

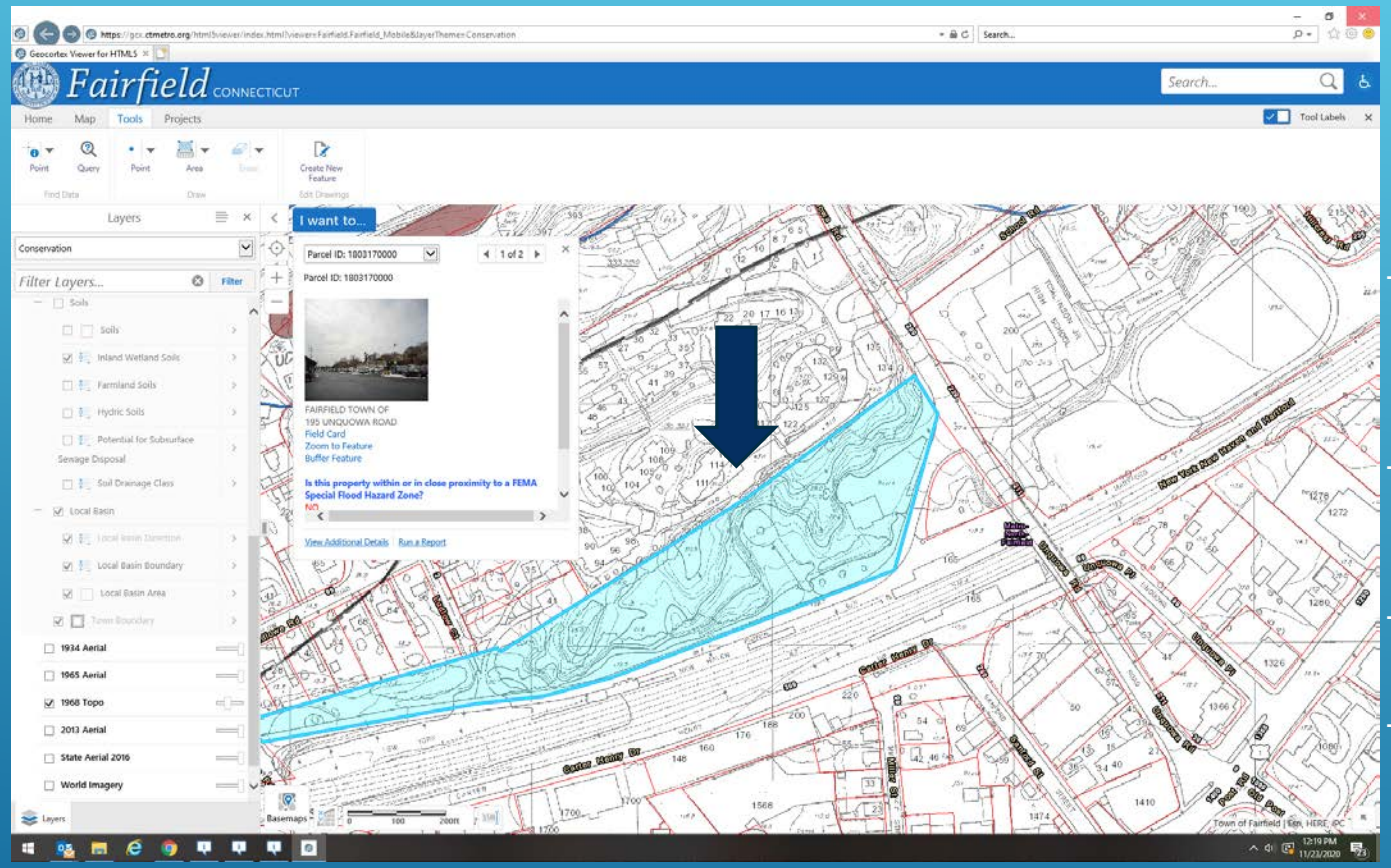




TOWN OF FAIRFIELD

- Population – approximately 62,000
- Size – 30 square miles
- Over 5 miles of coast line
- 10% of land area in FEMA Special Flood Hazard Zones
- I-95 and Metro North Rail bisects town just north of Special Flood Hazard Zones
- *Large commuter parking lots* in high demand – 2 yr. waiting list - $400/space/yr.
- Close proximity to Grand Central Station- Metro North New Haven Line

THEN....

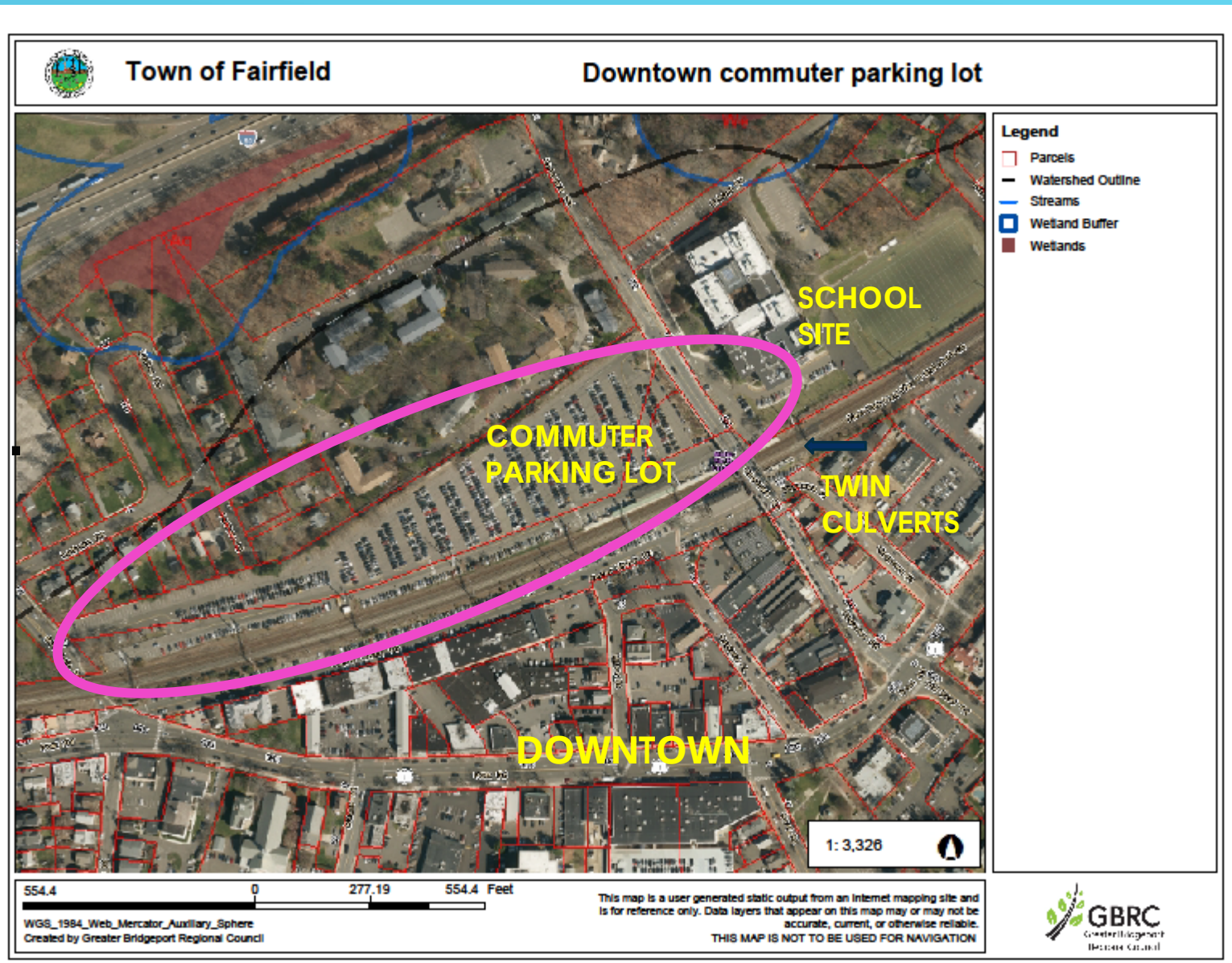


HISTORY OF SITE

- -Original size of commuter parking lot- 2 acres, 100 - 120 parking spaces
- 1986 Town purchased 5.25 acres- mostly rock ledge
- - 1989 -Created additional 800 spaces bringing total to 921 parking spaces in commuter lot by removing 80,000 cy of rock ledge
- - Parking lot impervious surface increased to 7.25 acres that drains east to twin culverts at RR tracks
- - Total area discharging through twin - 12" pipes under RR tracks- 16.25 acres of which 12 acres are impervious (commuter parking and school site)
- -Drainage systems are undersized
- - **Flooding occurs in commuter lot due to undersized pipes**

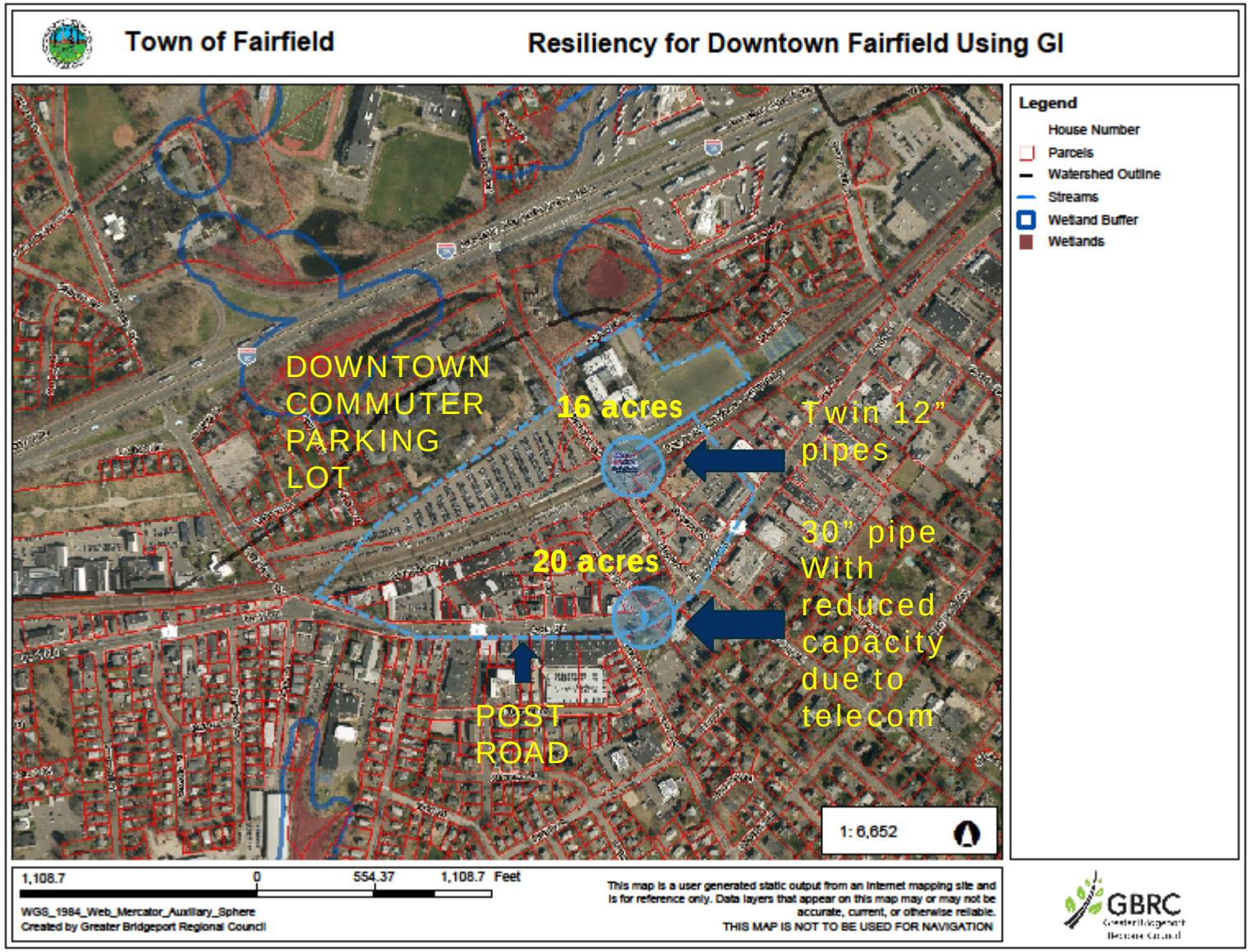
NOW...

920 SPACES



2012 -SUPER STORM SANDY RECEIVED A CDBG-DR PLANNING GRANT FROM: STATE OF CT DEPARTMENT OF HOUSING- "RESILIENCY FOR DOWNTOWN FAIRFIELD USING GREEN INFRASTRUCTURE –JULY 2018"

Milone & MacBroom , Inc. were selected for Planning Study and stated in the report, **"The best way to mitigate impervious surface runoff is to reduce the extent of impervious surfaces. This is likely not going to be an option applied extensively downtown. The two strategies that suggest themselves immediately for downtown are green roofs and the replacement of ground level impervious hardscape with pervious hardscape."** (Page 12)

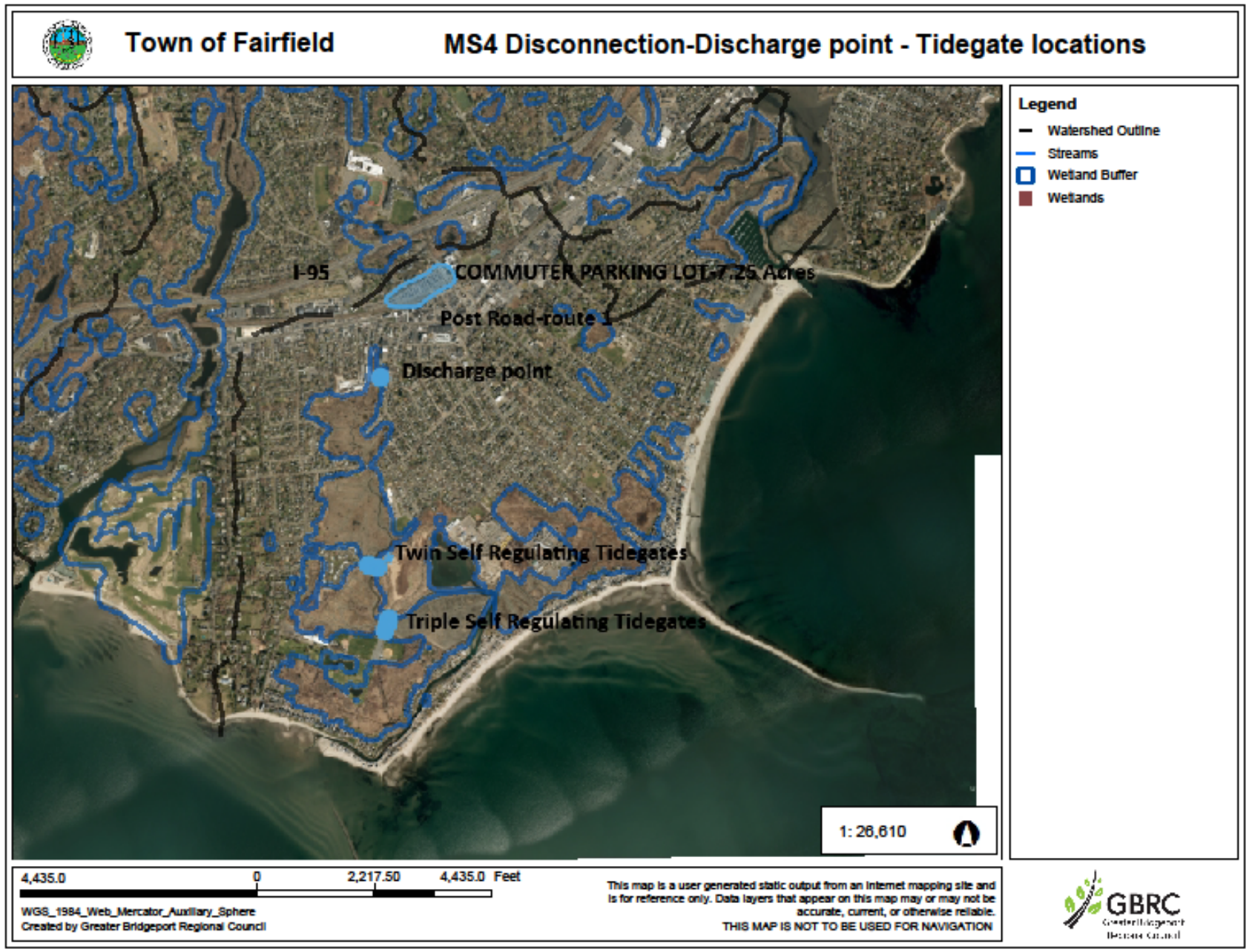


- Area of Interest for Planning Study – 36 acres
- Downtown commuter parking lot – 7.25 acres

Recommended adding pervious pavement to reduce stormwater runoff generated from this parking lot.

Restrictions in study area's drainage system:

- North of RR tracks -Twin 12" pipes under RR, for 16.25 acres of which 11.75 ac is impervious
- South end of study area -
  -30" pipe under Rt. 1- conveyance capacity reduced by telecom conduits that bisect pipe for entire 36 acre watershed
  -345kV line under Rt. 1


Town of Fairfield
MS4 Disconnection-Discharge point - Tidegate locations
I-95
COMMUTER PARKING LOT-7.25 Acres
Post Road-route 1
Discharge point
Twin Self Regulating Tidegates
Triple Self Regulating Tidegates
1: 26,610
Legend
Watershed Outline
Streams
Wetland Buffer
Wetlands
4,435.0 0 2,217.50 4,435.0 Feet
WGS_1984_Web_Mercator_Auxiliary_Sphere
Created by Greater Bridgeport Regional Council
This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.
THIS MAP IS NOT TO BE USED FOR NAVIGATION
GBRC

What happened?

CLIMATE CHANGE
SEA LEVEL RISE
RAIN BOMBS
INCREASE IN IMPERVIOUS AREAS

DOWNTOWN FLOODING BECOMES MORE AND MORE AND MORE FREQUENT

POST ROAD

SANFORD ST.

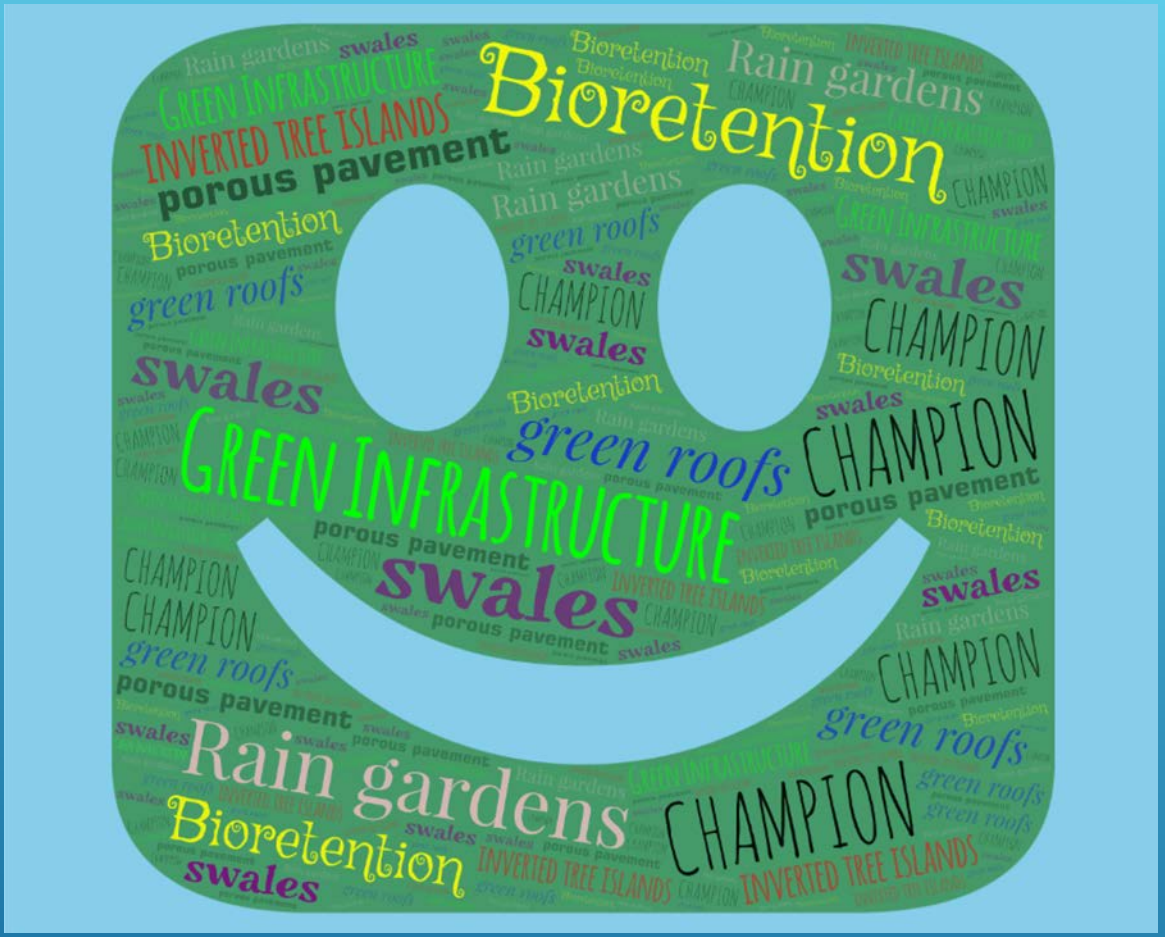
CT DEEP
MS4 REQUIREMENTS

HOW DO WE:

-Disconnect DCIA, 1% PER YEAR

-Find ways to disconnect impervious surfaces in highly urbanized area

- Retain the Water Quality Volume = 1” rainfall



ANSWER:
Use Green Infrastructure Technology:

- Porous pavement
- **Permeable pavers**
- **Dry wells**
- **Bio-filtration swales**
- **Inverted tree island**
- **Tree wells**
- **Rain gardens**
- **Green roofs**
- **Rain barrels**
- **Underground infiltration systems**
- **Have a Champion to promote GI**

- MSR4 REQUIREMENT IS TO RETAIN THE WQV ON SITE (DISCONNECT DCIA)
- DRAINS TO LONG ISLAND SOUND WHERE THERE ARE HIGH LEVELS OF HYPOXIA AND NITROGEN FROM STORMWATER POLLUTION.

- Water Quality Volume – THE VOLUME OF RUNOFF GENERATED FROM 1" OF RAINFALL ON A SITE.
- 90% OF ALL RAINFALL EVENTS IN A GIVEN YEAR GENERATE AN INCH OR LESS.

AVERAGE RECURRENCE INTERVAL

	1 YR	2 YR	5 YR	10 YR	25 YR	50 YR	100 YR
EST. RAINFALL	2.9"	3.5"	4.5"	5.3"	6.6"	7.5"	8.4"
RAINFALL LESS 1"	1.9"	2.5"	3.5"	4.3"	5.6"	6.5"	7.4"

THE PLAN:

TO RETROFIT THE COMMUTER PARKING LOT WITH POROUS PAVEMENT TO ACHIEVE A REDUCTION IN DCIA FOR A PORTION OF THE PARKING LOT

-APPROACHED THE *FAIRFIELD PARKING AUTHORITY* WITH IDEA TO USE POROUS PAVEMENT IN THE LOW POINT OF THE PARKING LOT WHERE ORIGINAL DRAINAGE SYSTEM EXISTED– (FPA was scheduled to repave the parking lot in 2018.)
REDUCES FLOODING, REMOVES POLLUTANTS AND KEEPS COMMUTER'S FEET DRY. FLOOD WATER OVERTOPPED COMMUTERS SHOES!

-POROUS PAVEMENT HAS BEEN USED ON PRIVATE PROPERTIES THROUGHOUT TOWN SUCCESSFULLY, IT WAS TIME FOR THE TOWN TO ALSO BEGIN USE OF IT.

FAIRFIELD PARKING AUTHORITY AGREES TO FUND THE PROJECT AND INSTALL POROUS PAVEMENT.

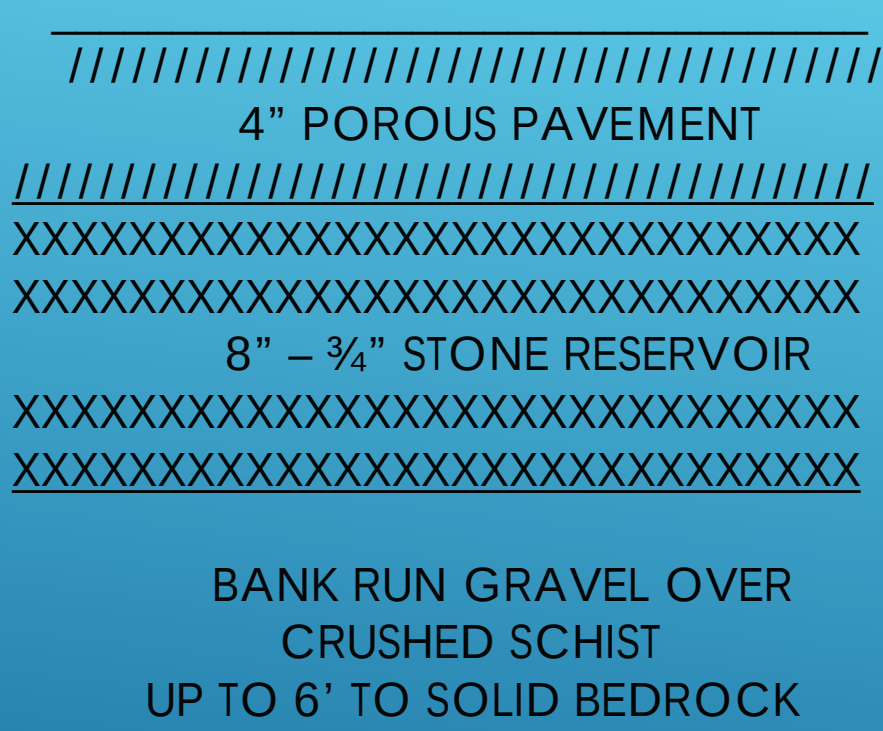
DECISION WAS MADE TO PLACE IT IN THE LOW POINT OF THE PARKING LOT WHICH HAPPENS TO BE IN FRONT OF THE TRAIN STATION AND PLATFORMS AND FLOODED ANKLE DEEP.

DIMENSIONS USED:
507.5’ X 72’ = 36,540 SF

POROUS PAVEMENT DETAIL

(NOT YOUR TYPICAL CROSS SECTION)

DEPTH OF STORAGE RESERVOIR NORMALLY 24” TO 36” IN DEPTH. DUE TO RESTRICTIVE LAYER AT SITE, TOWN OPTED TO USE AN 8” DEPTH AND LENGTHENED AREA OF PP RUNNING PARALLEL TO THE CONTOURS OF THE PARKING LOT TO CAPTURE RUNOFF FROM THE UPPER PORTIONS OF THE LOT WHILE USING EXISTING DRAINAGE SYSTEM, WHICH DICTATED LENGTH OF POROUS PAVEMENT AREA, JUST OVER 500’ LONG.



DISCONNECT THE DCIA

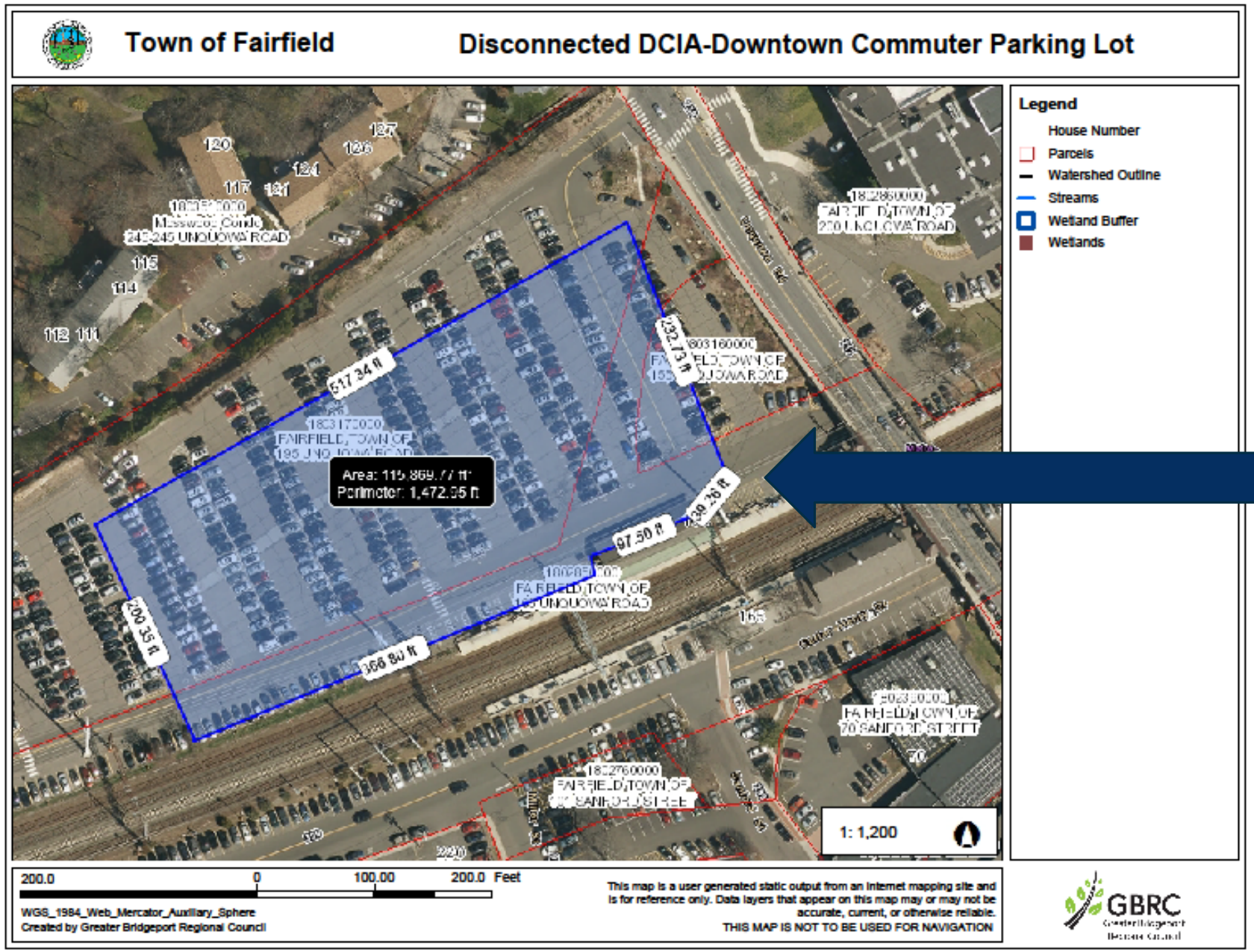
FIND THE AREA OF THE PARKING LOT THAT WILL BE DISCONNECTED FROM THE TOWN'S STORMWATER DRAINAGE SYSTEM BY USING THE WATER QUALITY VOLUME PROVIDED IN THE STONE RESERVOIR BELOW THE POROUS PAVEMENT:

AREA OF POROUS PAVEMENT = 507.5' X 72' = 36,540 SF
STORAGE VOLUME IN STONE RESERVOIR = 8"/12 x 36,540 x .4 = 9,744 CF

FIND PARKING LOT AREA:
WQV AVAILABLE = 9,744 CF = 1"/12 (PARKING LOT AREA)
PARKING LOT AREA = 116,928 SF

OR 2.68 ACRES OF WHICH THE WQV IS NOW CAPTURED AND RETAINED ON SITE

EXISTING PARKING LOT = 7.25 AC, disconnected 37% of the parking lot from the DCIA and 24% of the total watershed north of the RR tracks that drain through the twin 12" pipes.
Disconnected 7.4% from entire watershed drained by 30" pipe.
NOT A CURE ALL BUT CERTAINLY A START TO HELP REDUCE FLOODING.



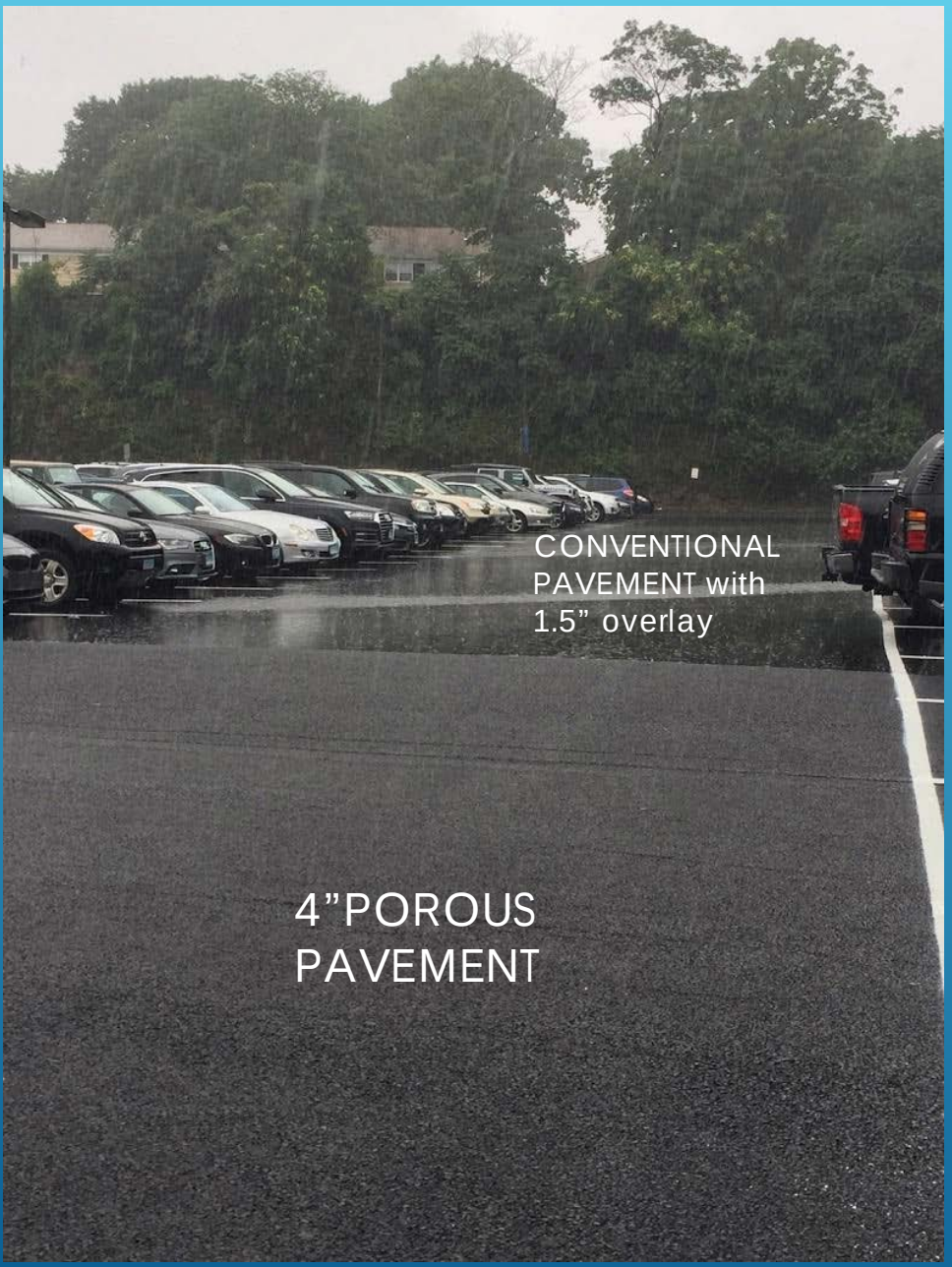
DISCONNECTED DCIA
2.68 ACRES

THE RETROFIT

ORIGINAL PAVEMENT MILLED, MATERIAL EXCAVATED 10.5” BELOW GRADE, 8” STONE RESERVOIR INSTALLED

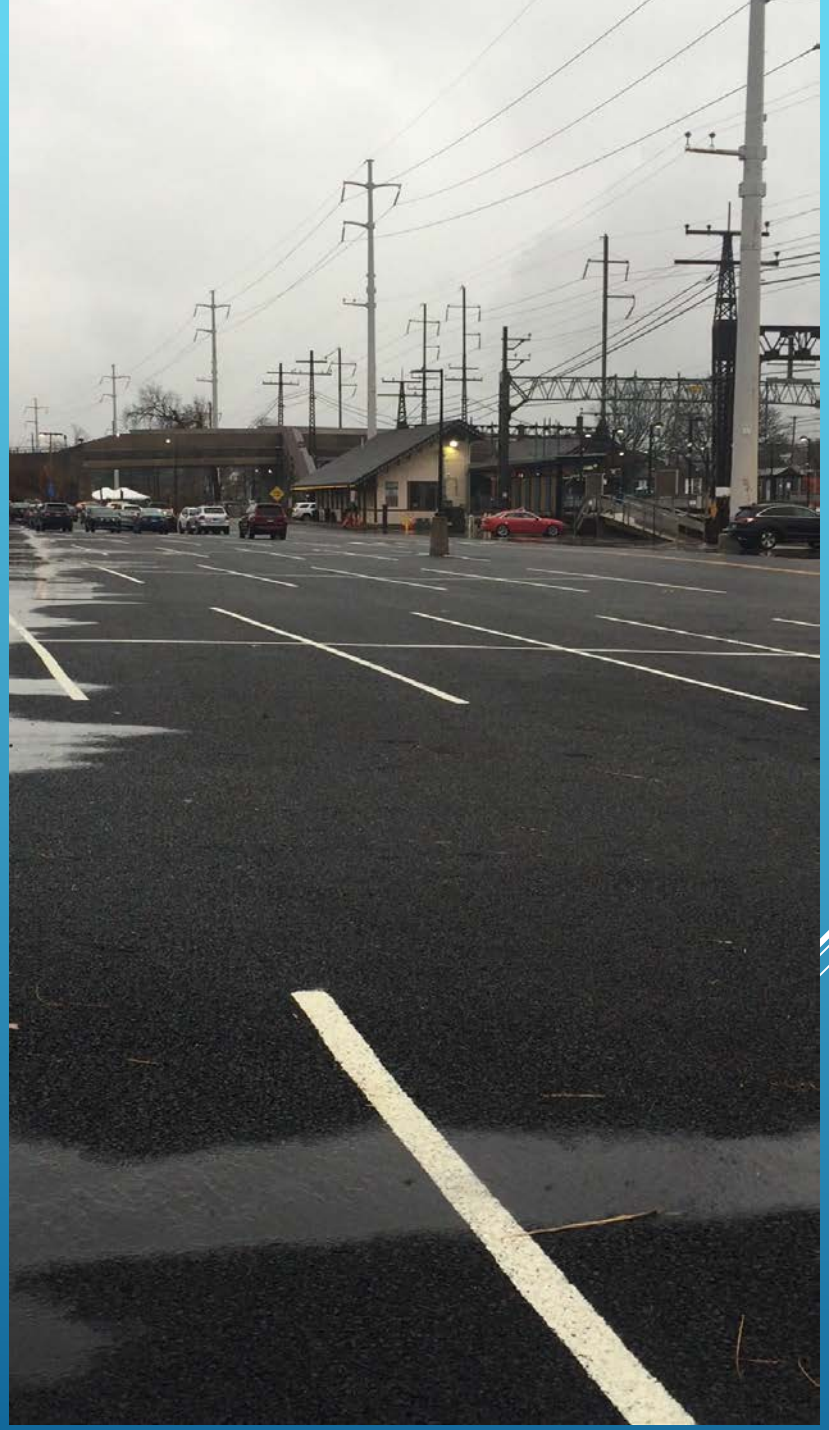
STONE RESERVOIR READY FOR POROUS PAVEMENT

CREWS PLACING 4” POROUS PAVEMENT OVER 8” -3/4” STONE RESERVOIR



FIRST RAIN EVENT August 2019

November 2020



November 2020

THE COST

MILL, GRADE AND ROLL STONE BED	$43,000
¾" WASHED STONE	$19,237
POROUS PAVEMENT- FURNISH AND INSTALL -	$184,000
COST POROUS PAVEMENT = =$ 6.74/SF OR $60/SY	$247,237
TOTAL COST TO OVERLAY WITH 1-1/2" HMA AND INSTALL POROUS PAVEMENT =	$504,071

POROUS PAVEMENT PRICE PER TON = $190 JULY 2019
HOT MIX ASPHALT PRICE PER TON = $87

Cost Porous Pavement vs Hot Mix Asphalt
$246,237 vs $32,000
Frequent flooding problem reduced, commuters are happy, disconnected DCIA = Priceless

Note: Parking lot last paved after construction, fall 1989, 30 year life.

REVENUE GENERATOR:

ANNUAL REVENUE FOR YEARLY PARKING PASS AND DAY PARKING OVER $500,000 ANNUALY

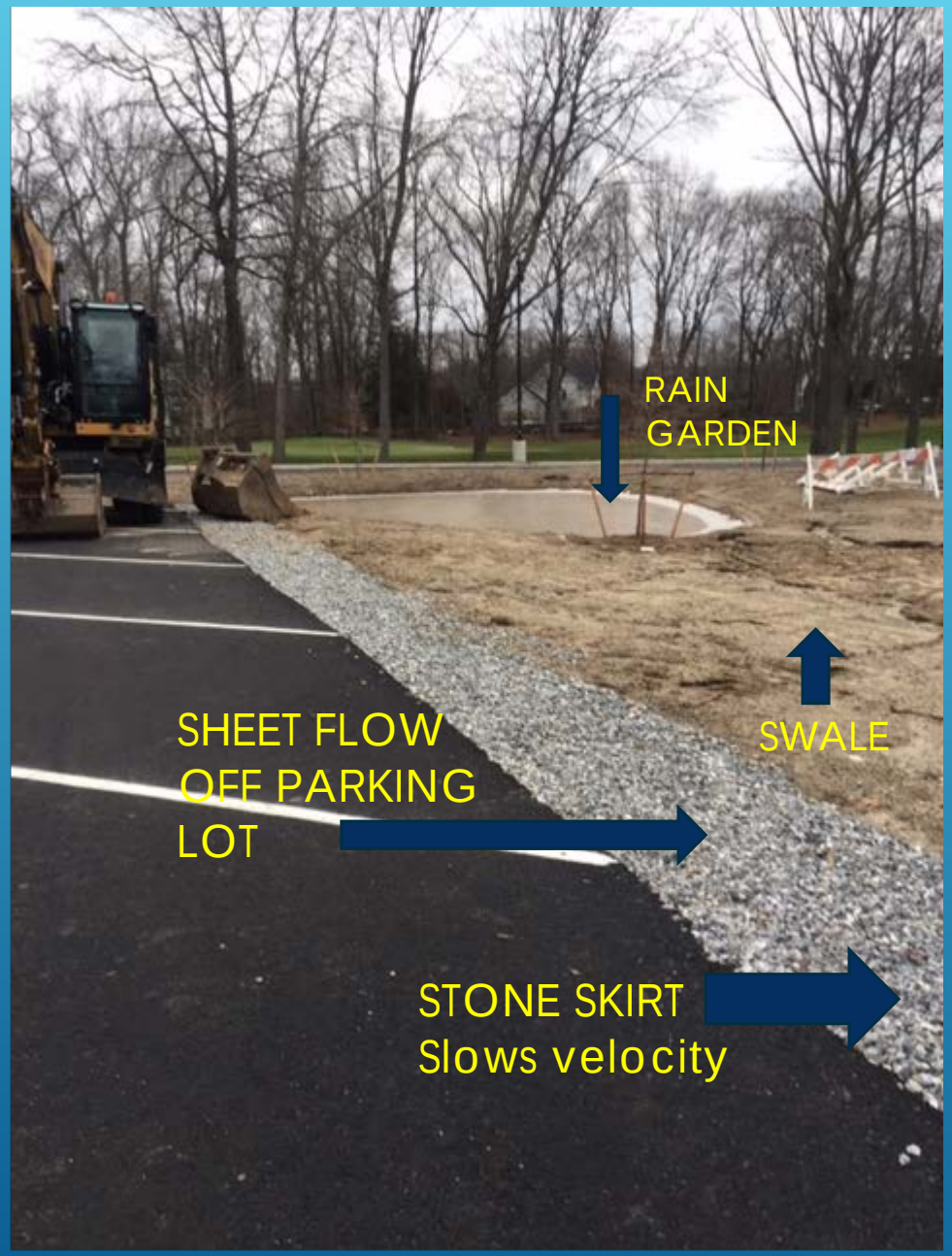
MAINTENANCE:

TYPICALLY REQUIRES VACUUMING ONCE OR TWICE PER YEAR, HOWEVER LOCATION IN DOWNTOWN, ADJACENT TO RR, LACK OF TREES & LANDSCAPING ACTIVITY, SALT VS SAND TREATMENT FOR DEICING, DOESN'T REQUIRE FREQUENT MAINTENANCE AT THIS TIME.

ADDITIONAL RETROFITS - TOWN OWNED PARKING LOTS

H. SMITH RICHARDSON GOLF COURSE UNDER CONSTRUCTION

MORE PHOTOS...RETROFITS



PAR 3 GOLF COURSE- TENNIS CENTER PARKING LOT- SOUTH PINE CREEK ROAD

H . SMITH RICHARDSON GOLF COURSE- MOREHOUSE HIGHWAY

BIOFILTRATION SWALE

PAR 3 GOLF COURSE- TENNIS CENTER PARKING LOT
SOUTH PINE CREEK ROAD

THANK YOU FOR LISTENING