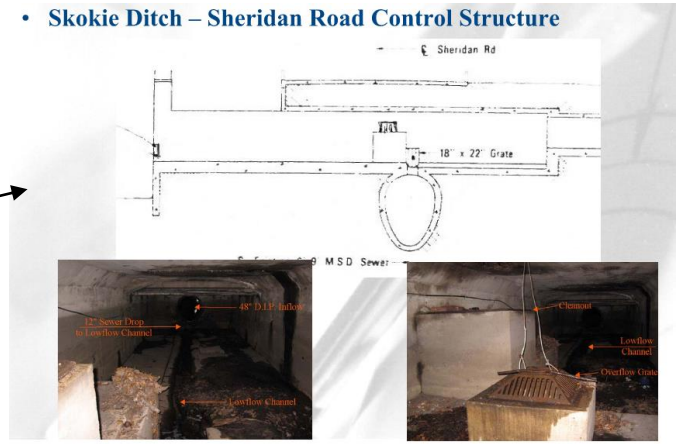
Village of Kenilworth Illinois

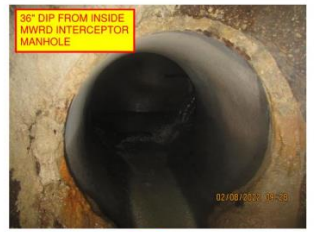
IAFSM Illinois Association for Floodplain and Stormwater Management

TERRA ENGINEERING LTD.

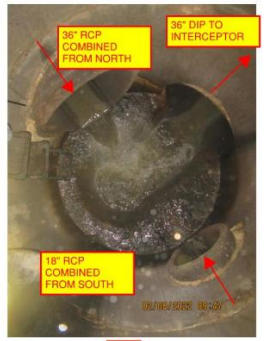
KENILWORTH GREEN STREETS - PHASE II

WATERSHEDS





A



B

Village of Kenilworth Illinois

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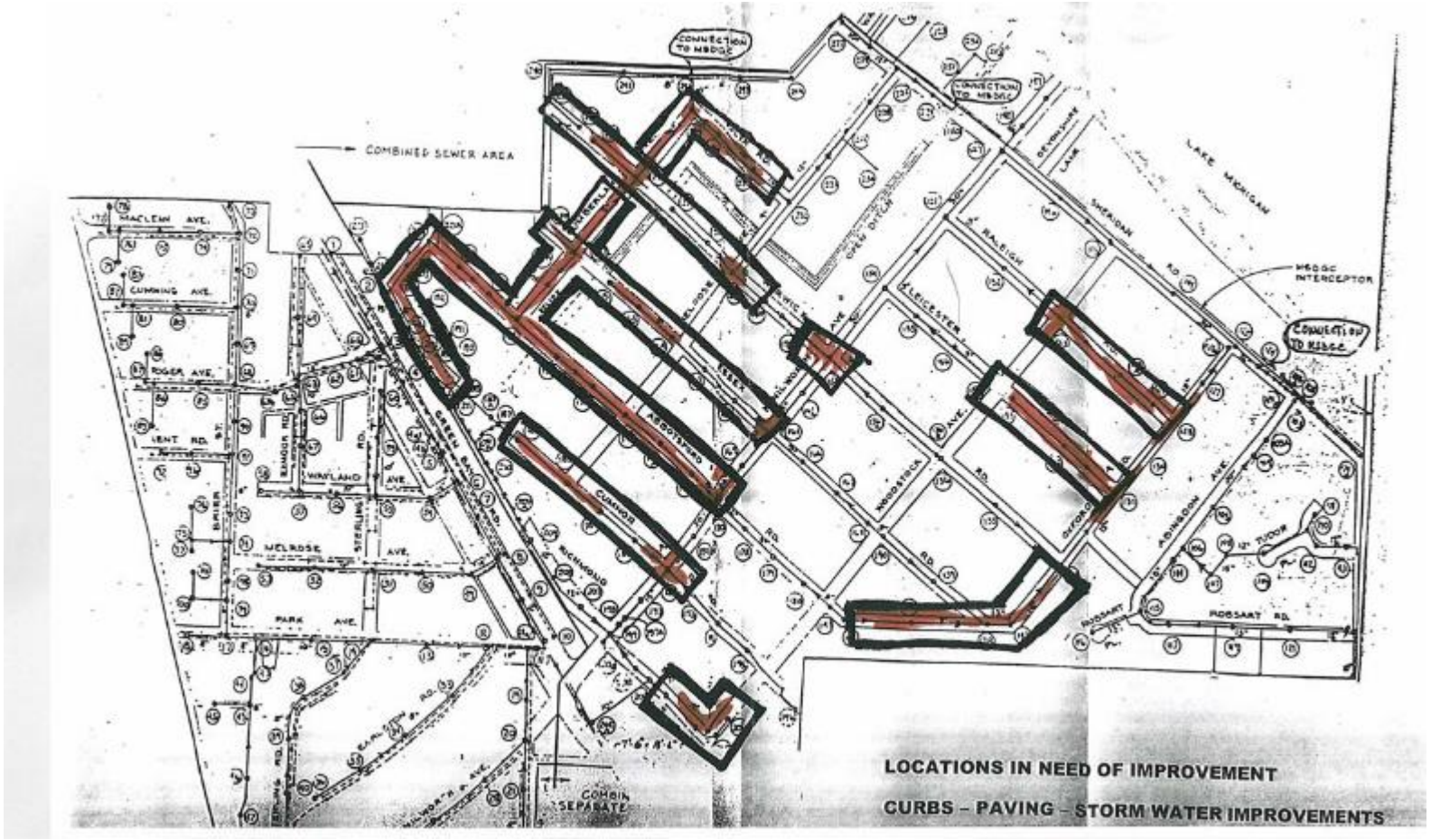
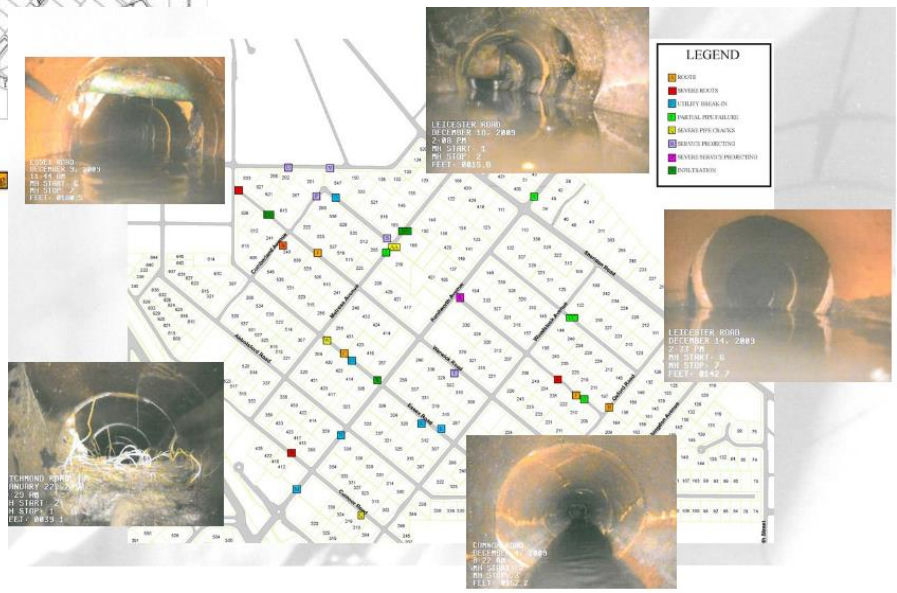
BACKGROUND



Known Flooding Locations

BACKGROUND

- Combined sewer system
- Under-sized sewer
- Topographical features
  - Flat topography
  - High overflow elevations
  - Local depressions
- Upstream tributary areas
- Skokie Ditch overflows

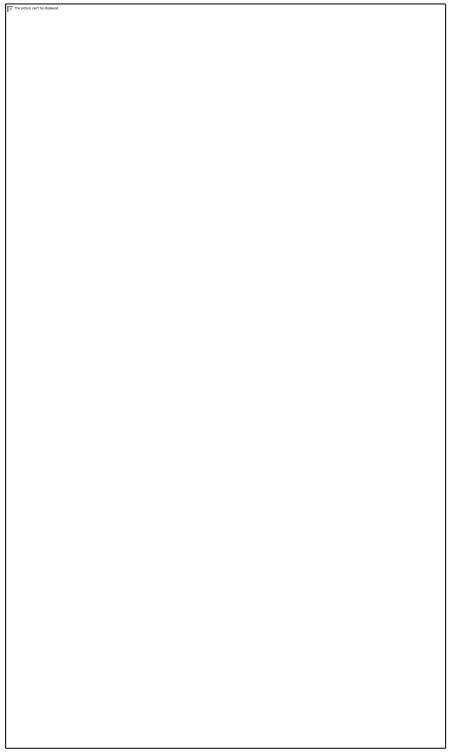


PROJECT PHASES

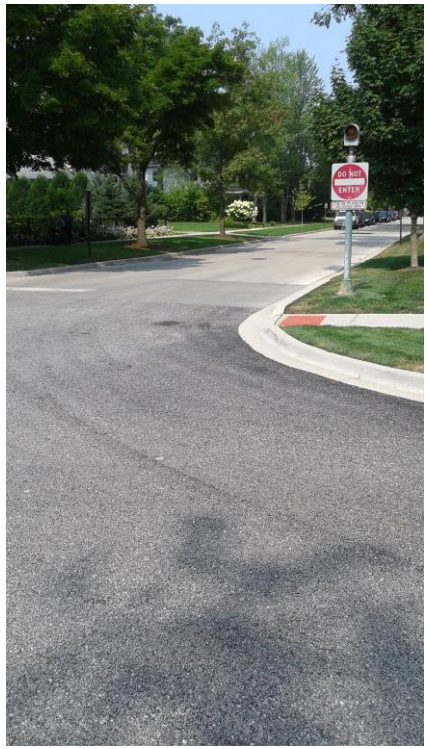
SOLUTIONS

- Separate storm sewers
- Reconstruction of roadways
  - Overland flow pathways
  - Curbs and street ponding
- Stormwater storage
  - Green infrastructure
  - Oversized storm sewers
  - Street ponding
- MWRD interceptor outfalls
- Repair and lining of sewer

Porous Parkway/ Roadside Swale



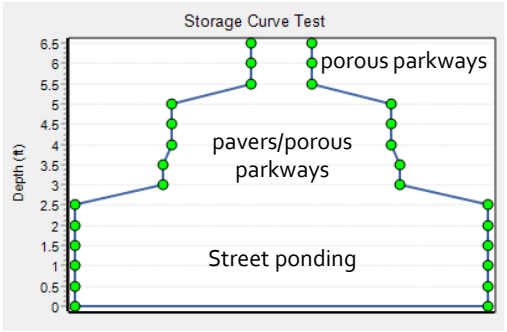
Permeable Pavers



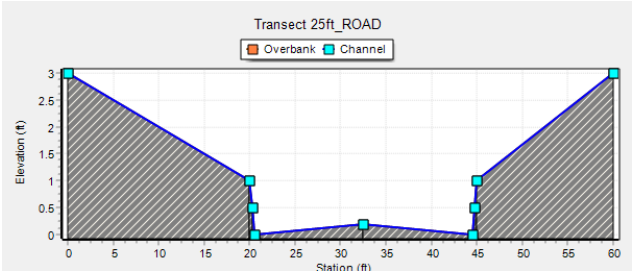
Porous Asphalt

H&H MODELING

- Streets are subdivided into sections represented by nodes and storage units.

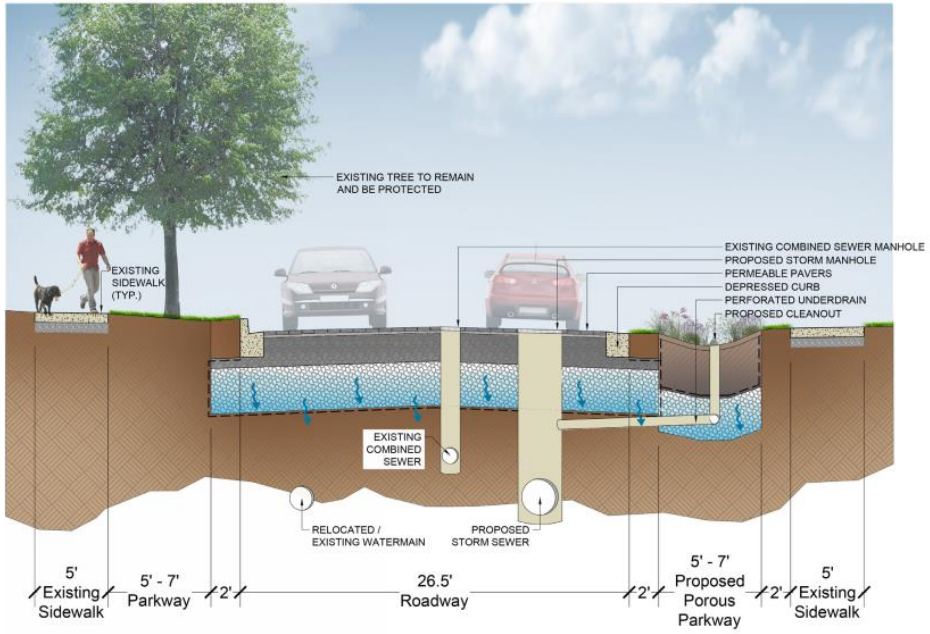


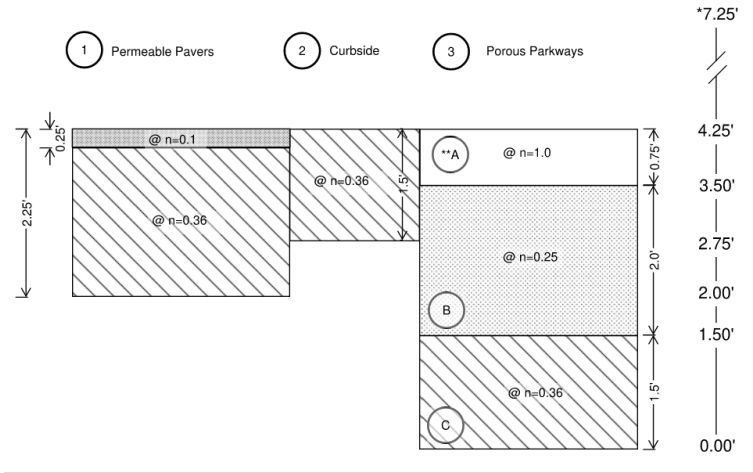
- Streets overland flows are modeled as open channels with street cross-sections

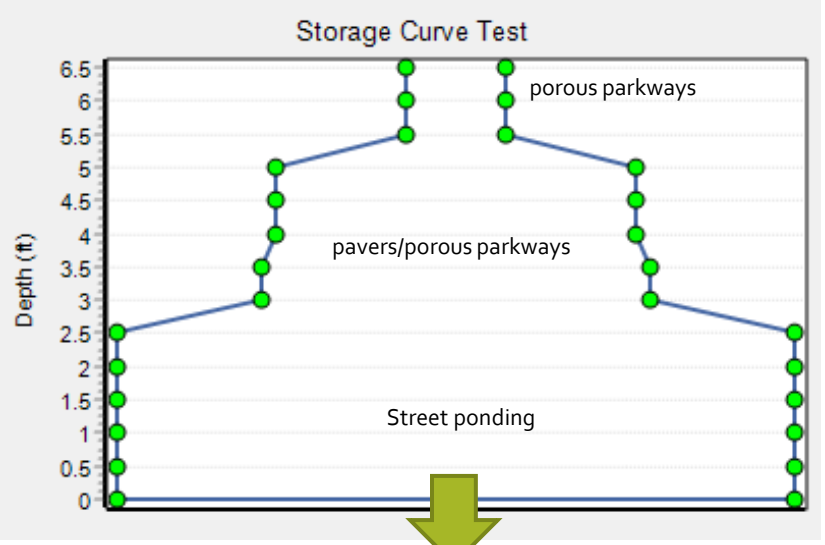


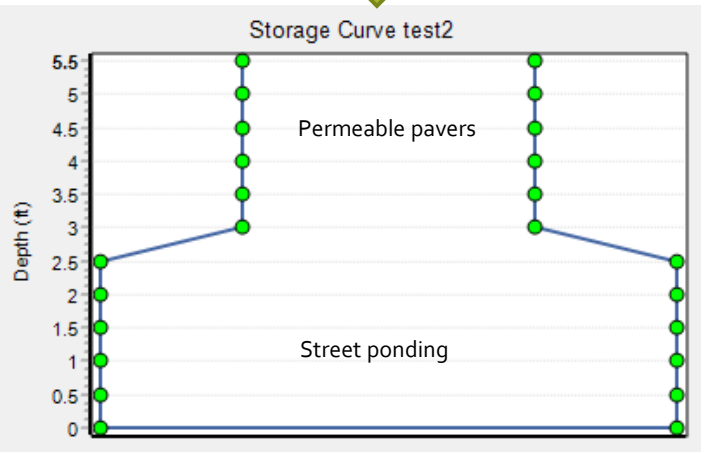
EPA SWMM

H&H MODELING

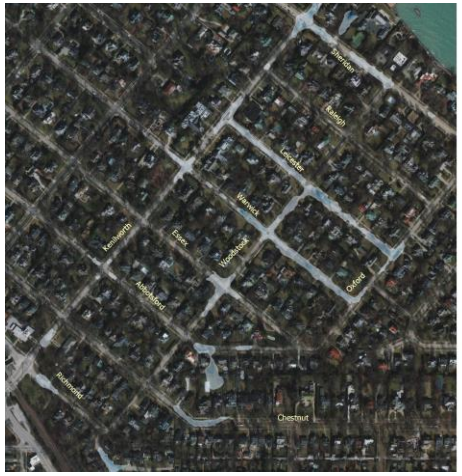
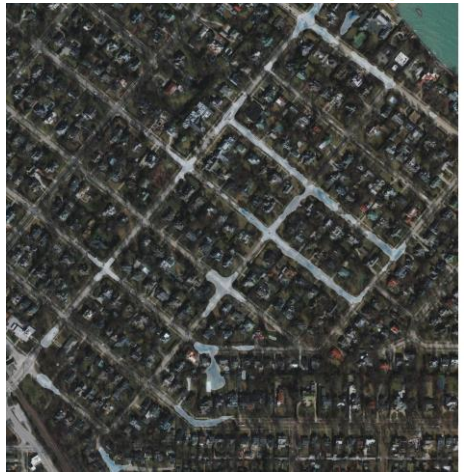
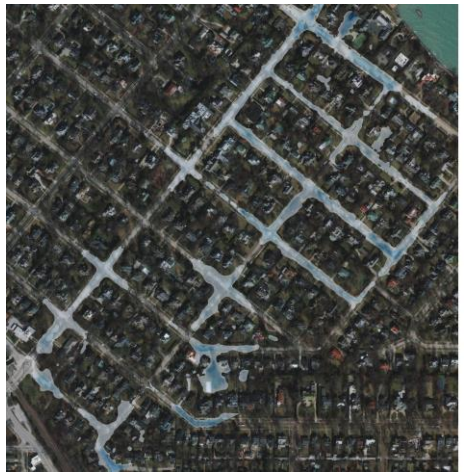

EXISTING TREE TO REMAIN AND BE PROTECTED
EXISTING SIDEWALK (TYP.)
EXISTING COMBINED SEWER MANHOLE
PROPOSED STORM MANHOLE
PERMEABLE PAVERS
DEPRESSED CURB
PERFORATED UNDERDRAIN
PROPOSED CLEANOUT
EXISTING COMBINED SEWER
RELOCATED / EXISTING WATERMAIN
PROPOSED STORM SEWER
5' Existing Sidewalk
5' - 7' Parkway
2'
26.5' Roadway
2'
5' - 7' Proposed Porous Parkway
2'
5' Existing Sidewalk


1 Permeable Pavers
2 Curbside
3 Porous Parkways
*7.25'
4.25'
3.50'
2.75'
2.00'
1.50'
0.00'
0.25
2.25'
@ n=0.1
@ n=0.36
@ n=0.36
1.5'
**A
@ n=1.0
@ n=0.25
B
2.0'
0.75'
@ n=0.36
C
1.5'

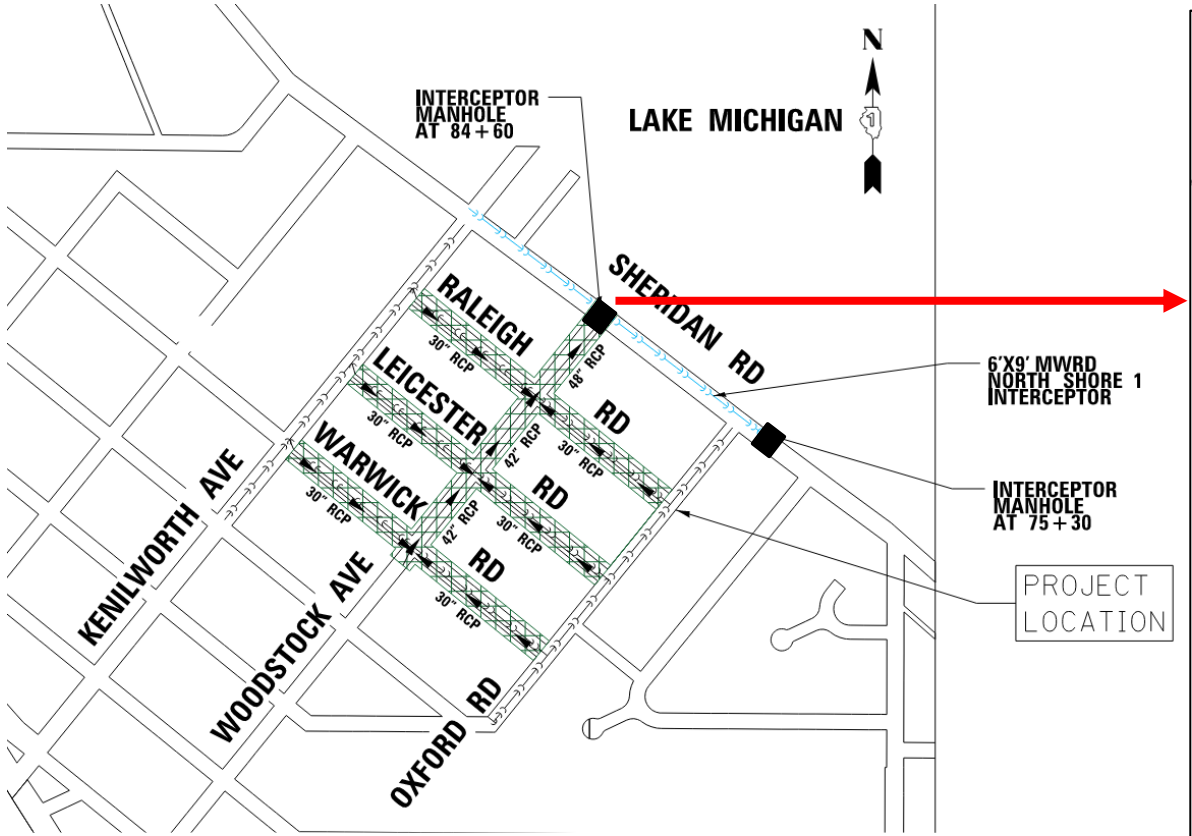

Storage Curve Test
Depth (ft)
6.5
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
porous parkways
pavers/porous parkways
Street ponding

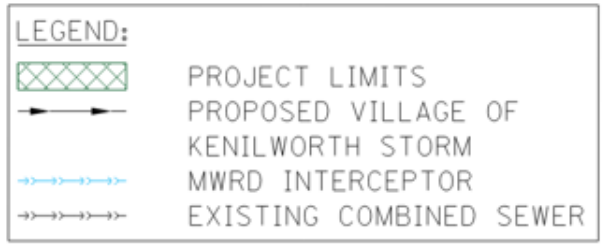

Storage Curve test2
Depth (ft)
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Permeable pavers
Street ponding

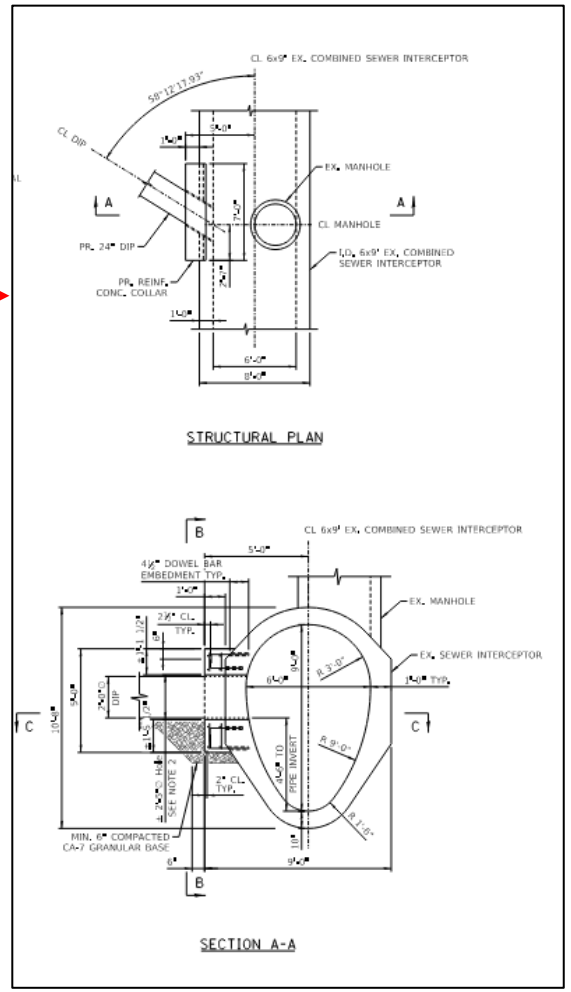
H&H MODELING

	Existing	Proposed	No Porous Parkway
10-year			
50-year			

FINAL DESIGN

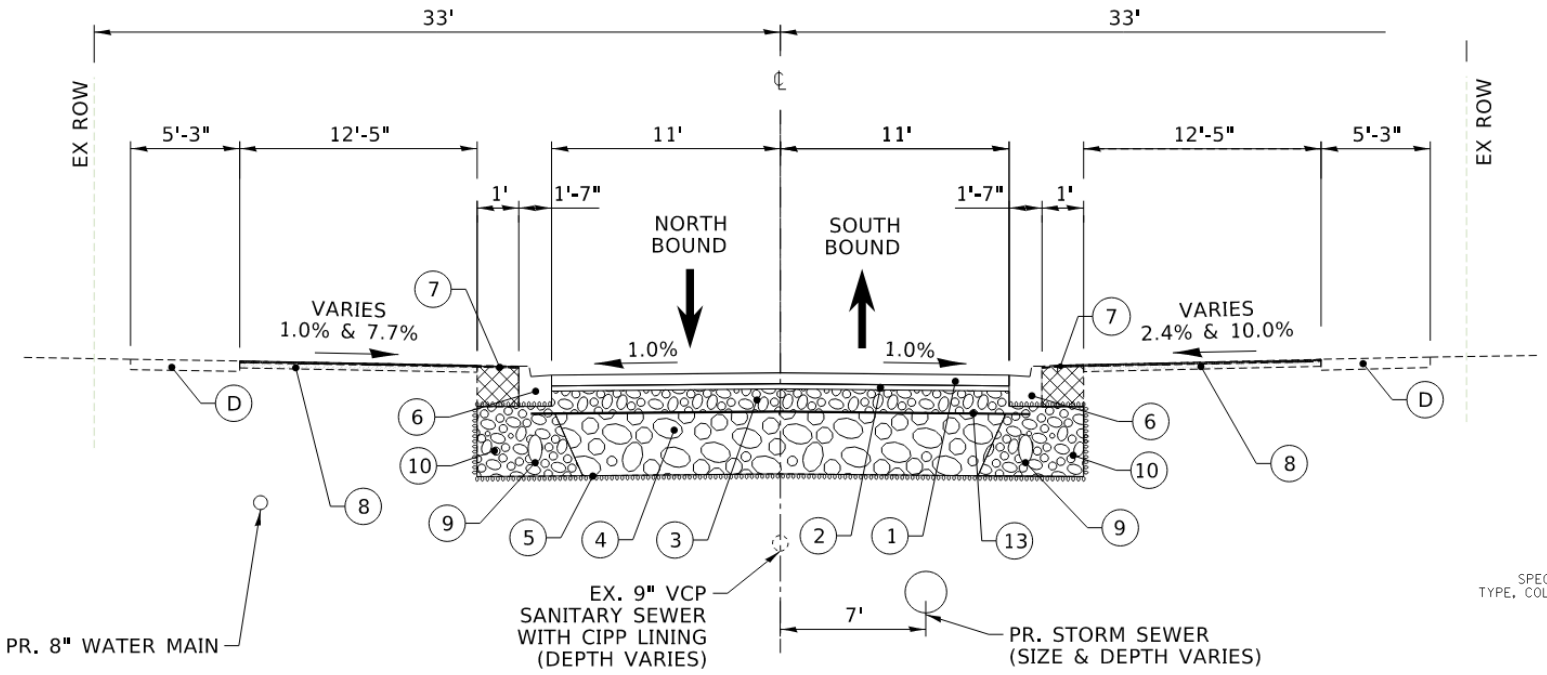






- Existing connection to MWRD Interceptor reduced from 36" to 24" by installing a restrictor plate
- New 24" connection to MWRD interceptor at Woodstock-Sheridan

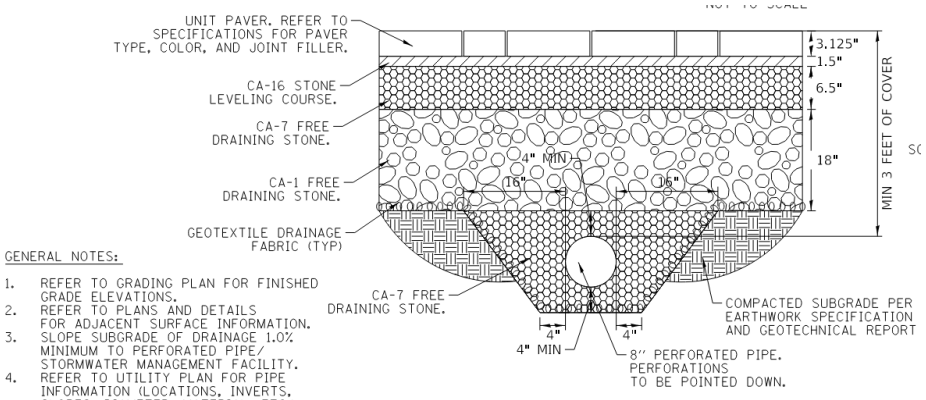
FINAL DESIGN



PROPOSED TYPICAL SECTION

RALEIGH ROAD AT THE INLETS
STA 40+39.77 TO STA 46+65.01
STA 47+30.80 TO STA 54+03.01

1. PERMEABLE PAVERS - 3.125" UNI-LOCK ECO-OPTILOC WITH NORDIC STAR COLOR AND SERIES FINISH
2. PERMEABLE BASE COURSE - 1-1/2" WASHED CRUSHED STONE CA-16
3. PERMEABLE BASE COURSE - 6-1/2" WASHED CRUSHED STONE CA-7
4. PERMEABLE SUBBASE - 18" (WASHED CRUSHED STONE CA-1)
5. GEOTEXTILE FILTER FABRIC, WOVEN MONOFILAMENT GEOTEXTILE FABRIC WITH AOS OF 0.5MM, MEETING IUM MATERIAL SPECIFICATION 592
6. COMBINATION CONCRETE CURB AND GUTTER, TYPE B-6.12 (9" FLAG DEPTH)
7. SODDING OVER TOPSOIL
8. SODDING AND TOPSOIL, FURNISH AND PLACE, 4"
9. PERFORATED 8" UNDERDRAIN EXTENDED 20 FEET ON EACH SIDE OF CURB CATCH BASINS
10. WASHED CRUSHED STONE CA-7 UNDERDRAIN TRENCH, SEE LATERAL UNDERDRAIN DETAIL ON SHEET 100
11. PORTLAND CEMENT CONCRETE SIDEWALK, 5" (WHERE SHOWN ON PLANS OR AS DETERMINED BY THE ENGINEER)
12. AGGREGATE BASE COURSE, TYPE B-4
13. UNI-LOCK DRIVEGRID GEOGRID SYSTEM WITH TENSAR TRIAX TECHNOLOGY



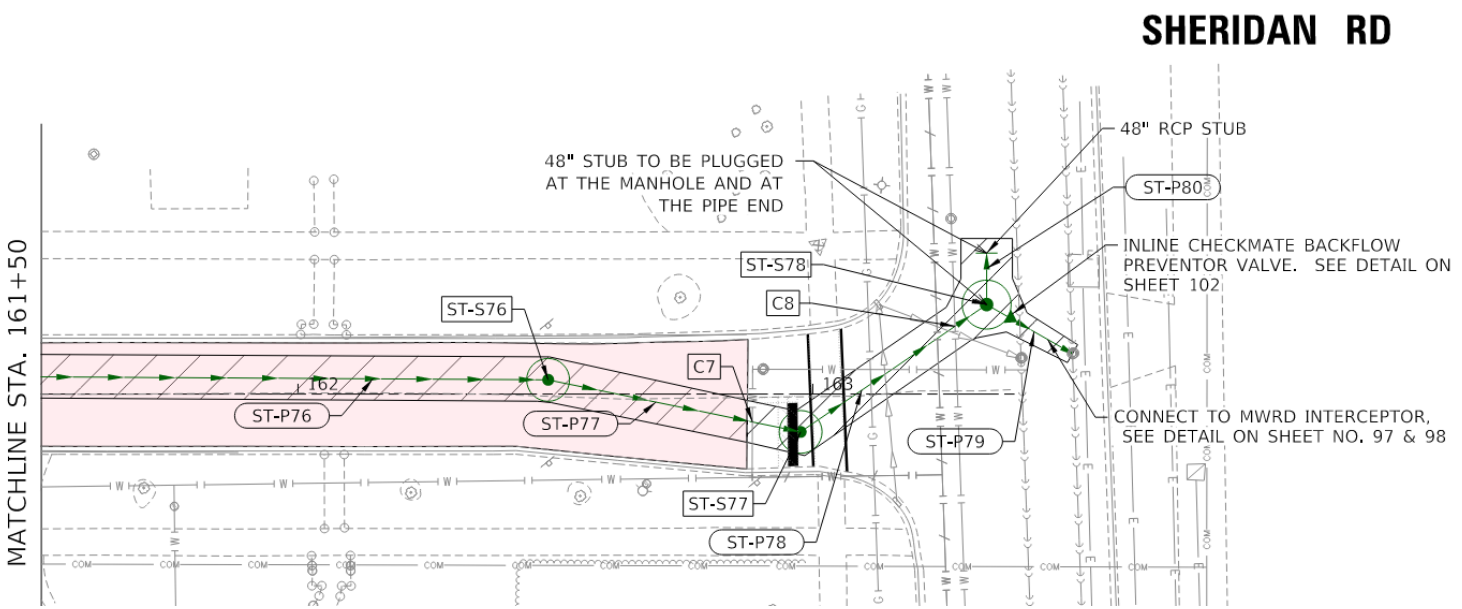
GENERAL NOTES:

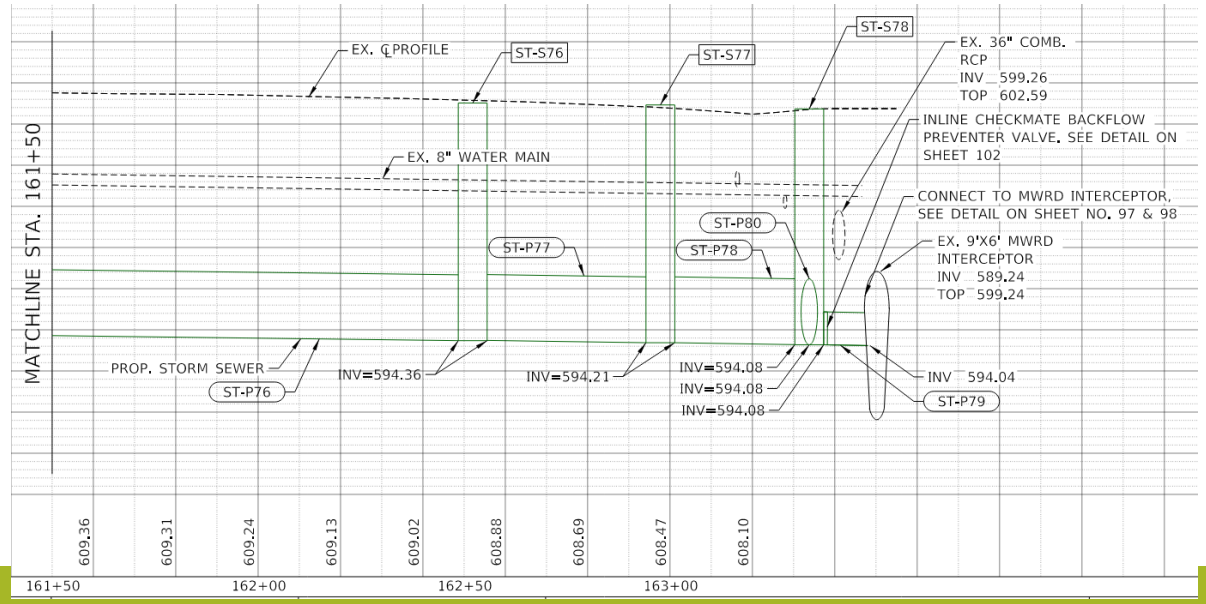
1. REFER TO GRADING PLAN FOR FINISHED GRADE ELEVATIONS.
2. REFER TO PLANS AND DETAILS FOR ADJACENT SURFACE INFORMATION.
3. SLOPE SUBGRADE OF DRAINAGE 1.0% MINIMUM TO PERFORATED PIPE/ STORMWATER MANAGEMENT FACILITY.
4. REFER TO UTILITY PLAN FOR PIPE INFORMATION (LOCATIONS, INVERTS, SLOPES, DIAMETER, MATERIAL, ETC.)

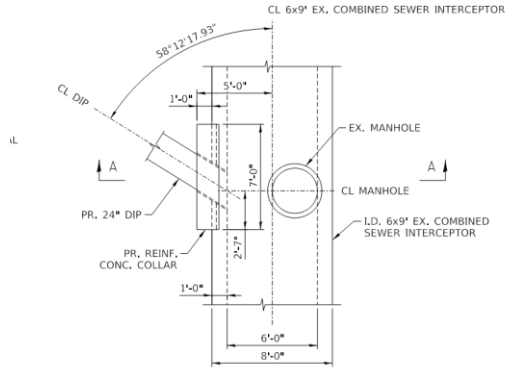
PERMEABLE PAVER WITH UNDERDRAIN

NOT TO SCALE

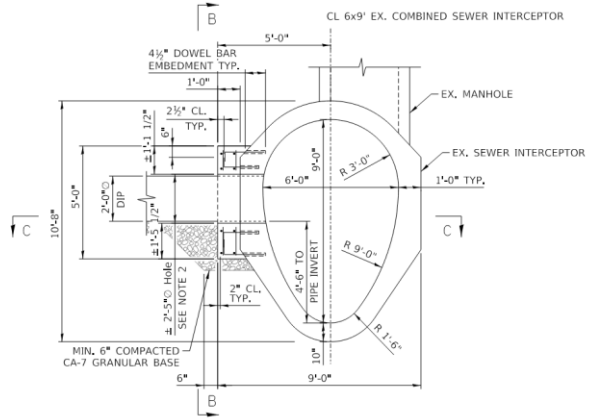
FINAL DESIGN





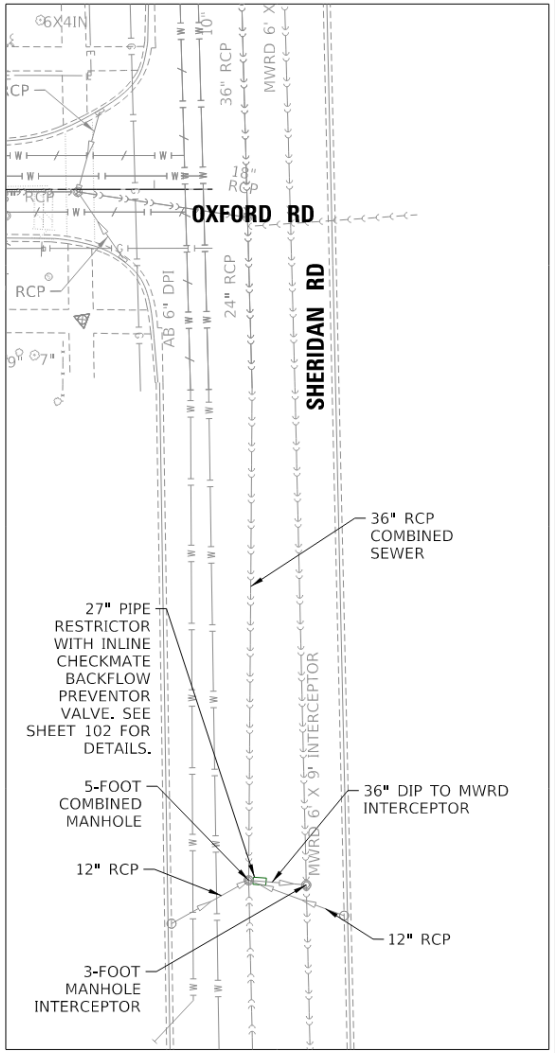


STRUCTURAL PLAN

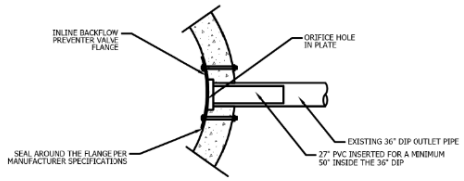


SECTION A-A

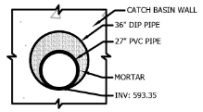
FINAL DESIGN



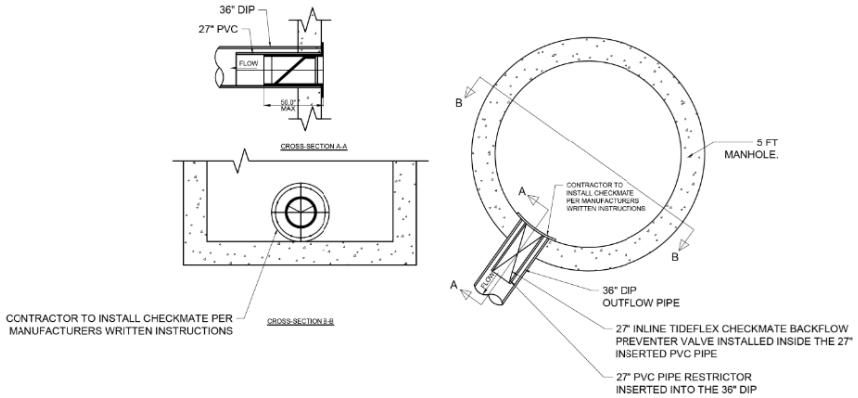
LOCATION OF EXISTING CONNECTION TO NORTH SHORE 1 INTERCEPTOR, SOUTH OF OXFORD-SHERIDAN INTERSECTION AT STA. 75+30

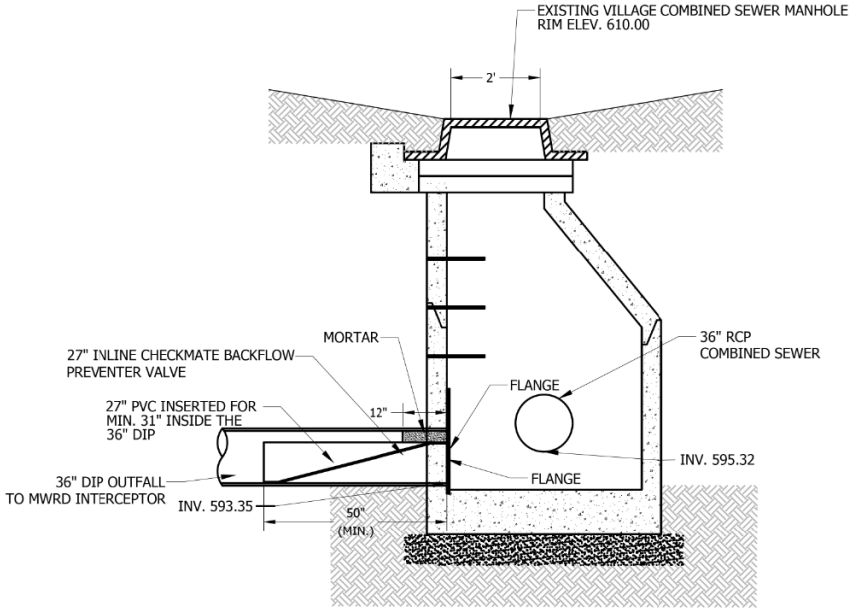


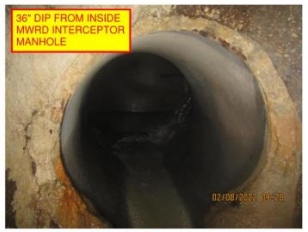
OUTLET PIPE AND BACKFLOW PREVENTER : SECTION



OUTLET PIPE : SECTION



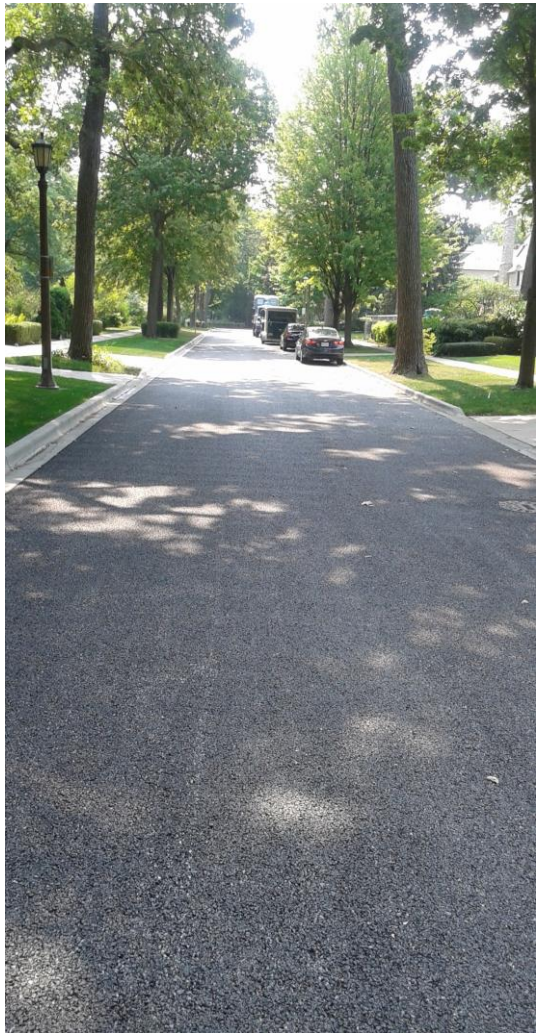




A

B

PERMEABLE PAVEMENT



Kenilworth Phase I – Porous Asphalt

Porous Asphalt

Advantages

Cost Effective

Quick Installation

High storage per square foot

Broader and continuous infiltration surface area

Disadvantages

- Traffic disruption for repairs

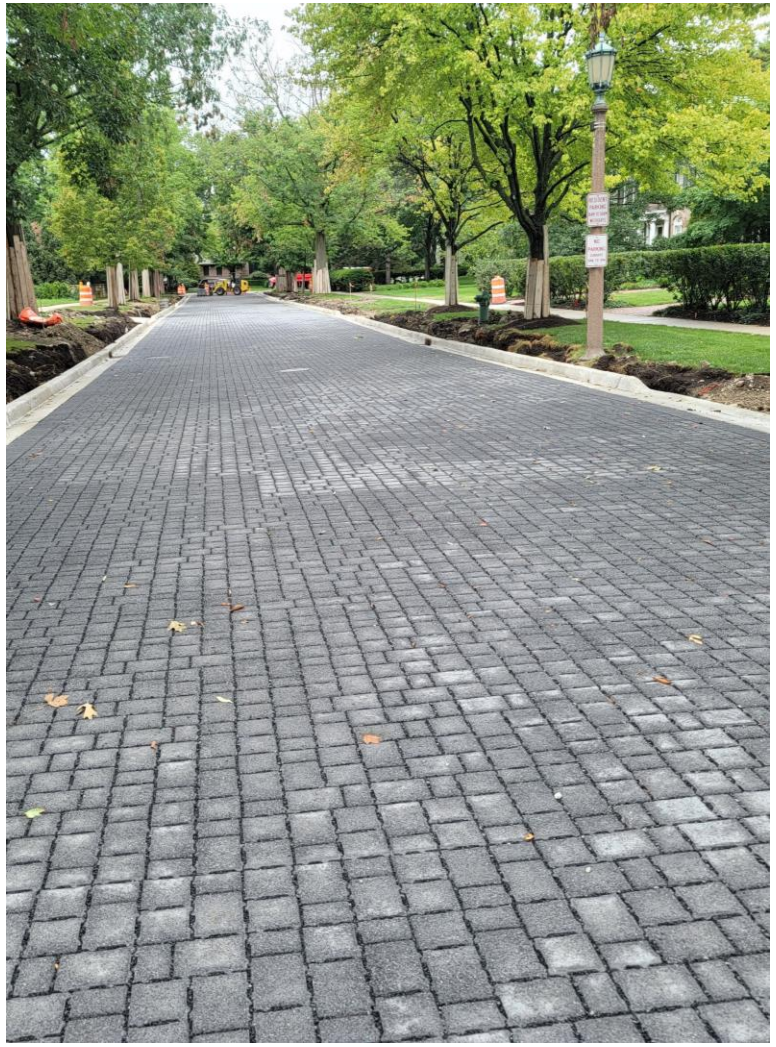
More Maintenance

Short Lifetime
9 years

Lessons learned from application in Phase I:

- raveling – showing signs of premature wear in areas of high turning movements
- binding – where high overland flow is reaching roadway (intersecting streets, and drive aprons)
- sand veins have caused minor undercutting

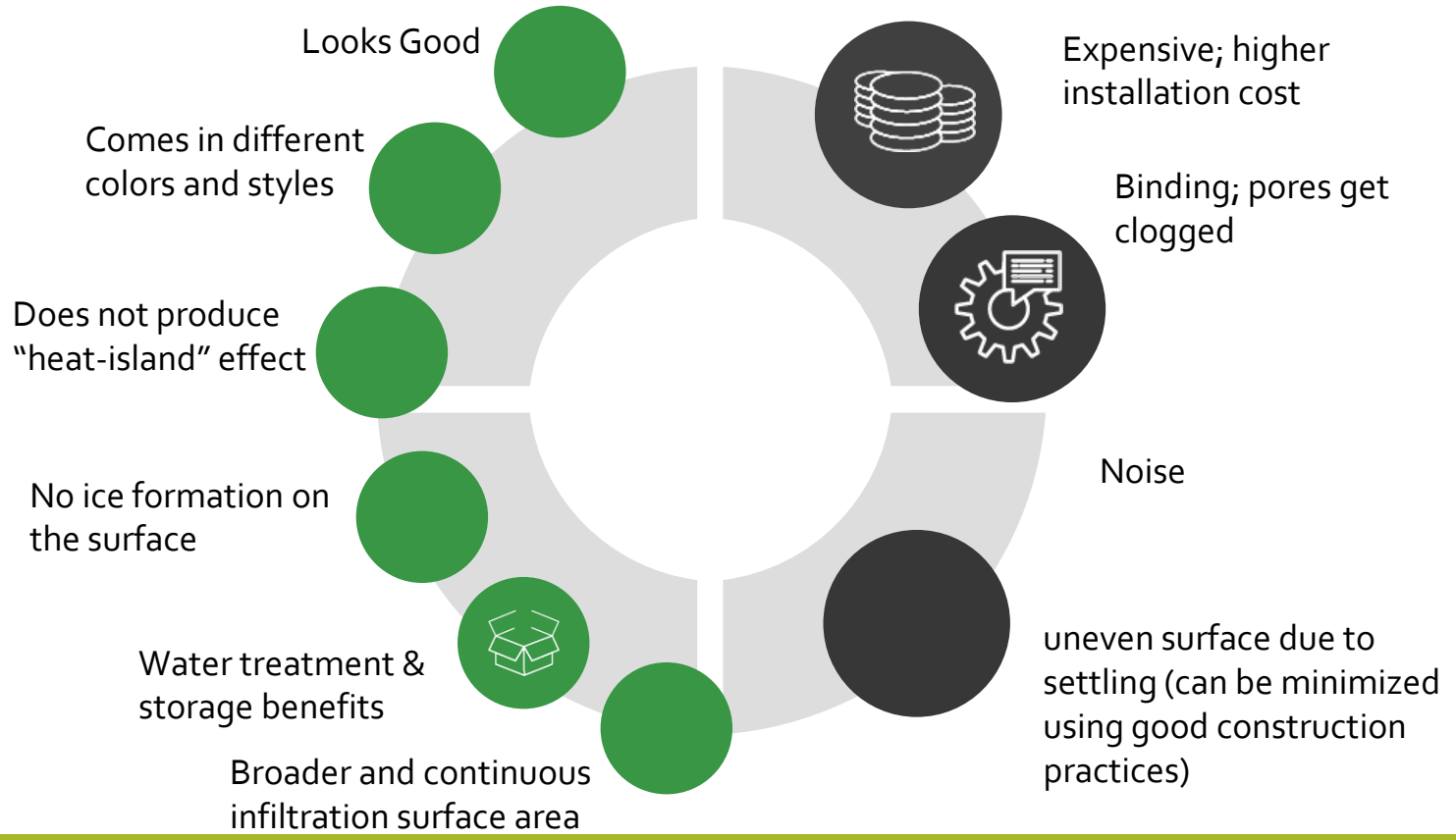
PERMEABLE PAVEMENT



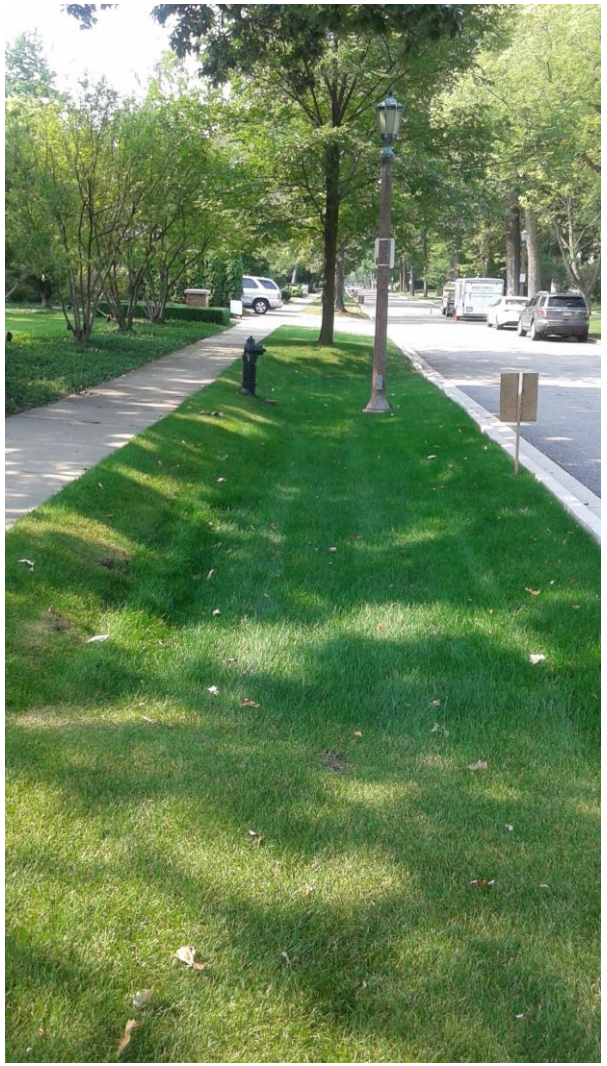
Kenilworth Phase II – Permeable pavers

Permeable Pavers

- Easy to repair
- Re-use pavers
- Long life cycle
- Minimal disruption in traffic



POROUS PARKWAYS



Kenilworth Phase I – Porous Parkways

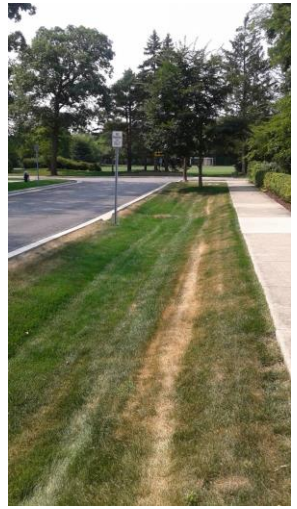
Porous Parkways

Advantages

- Water Quality benefits
- Cost-effective Construction
- Natural Stormwater management
- Can be used in combination with other alternatives

Disadvantages

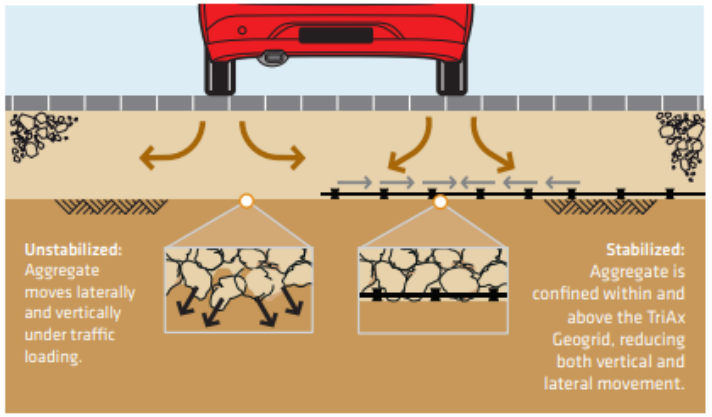
- Limited space in parkways, Trees
- utility conflicts
- Limited Storage



Lessons learned from application in Phase I:
Settling – combination of not compacting and deterioration of organics
Settling back of the curbs cause mowing and maintenance problems

DESIGN CONSIDERATIONS

- Reversed curbs to promote infiltration through pavers
- Distribution of stormwater evenly in stone base
- Using Geogrid to improve stability of the pavement, distribute the load evenly on the base
- Utility relocations must be coordinated well in advance with utility agencies and constructed in advance
- Construction staging and logistics plan
- Construction phasing
- Tree protection and preservation



StormStore™ Storage Credit Trading

- Applied for the storage volume credit from MWRD, and we approved for the 0.952 ac-ft of volume control credit for trading.

https://mwrd.org/detention-and-volume-control-trading

- The very first project in a non-pilot WPA (Watershed Planning Areas)

Lower Des Plaines River
0.20 cfs/acre allowable release

There are currently no sites available for trading within this WPA. We will update the website as supply sites become available.

Permit Number	Detention Volume	Volume Control Volume	Notes

Little Calumet River
0.25 cfs/acre allowable release

Permit Number	Detention Volume	Volume Control Volume	Notes
21-163	None	0.036 ac-ft	None

Site Limitations and Constraints are currently needed to trade volume in other WPAs

Calumet-Sag Channel
0.30 cfs/acre allowable release

There are currently no sites available for trading within this WPA. We will update the website as supply sites become available.

Permit Number	Detention Volume	Volume Control Volume	Notes

North Branch of the Chicago River
0.30 cfs/acre allowable release

Permit Number	Detention Volume	Volume Control Volume	Notes
19-341	None	0.952	

Poplar Creek
0.25 cfs/acre allowable release

There are currently no sites available for trading within this WPA. We will update the website as supply sites become available.

Permit Number	Detention Volume	Volume Control Volume	Notes

Upper Salt Creek
0.20 cfs/acre allowable release

There are currently no sites available for trading within this WPA. We will update the website as supply sites become available.

Permit Number	Detention Volume	Volume Control Volume	Notes

Village of Kenilworth Illinois

IAFSM Illinois Association for Floodplain and Stormwater Management

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QUESTIONS?