



# Sharp Avenue Permeable Pavement Project

Climate Resilience and Sustainability Board

July 10, 2025

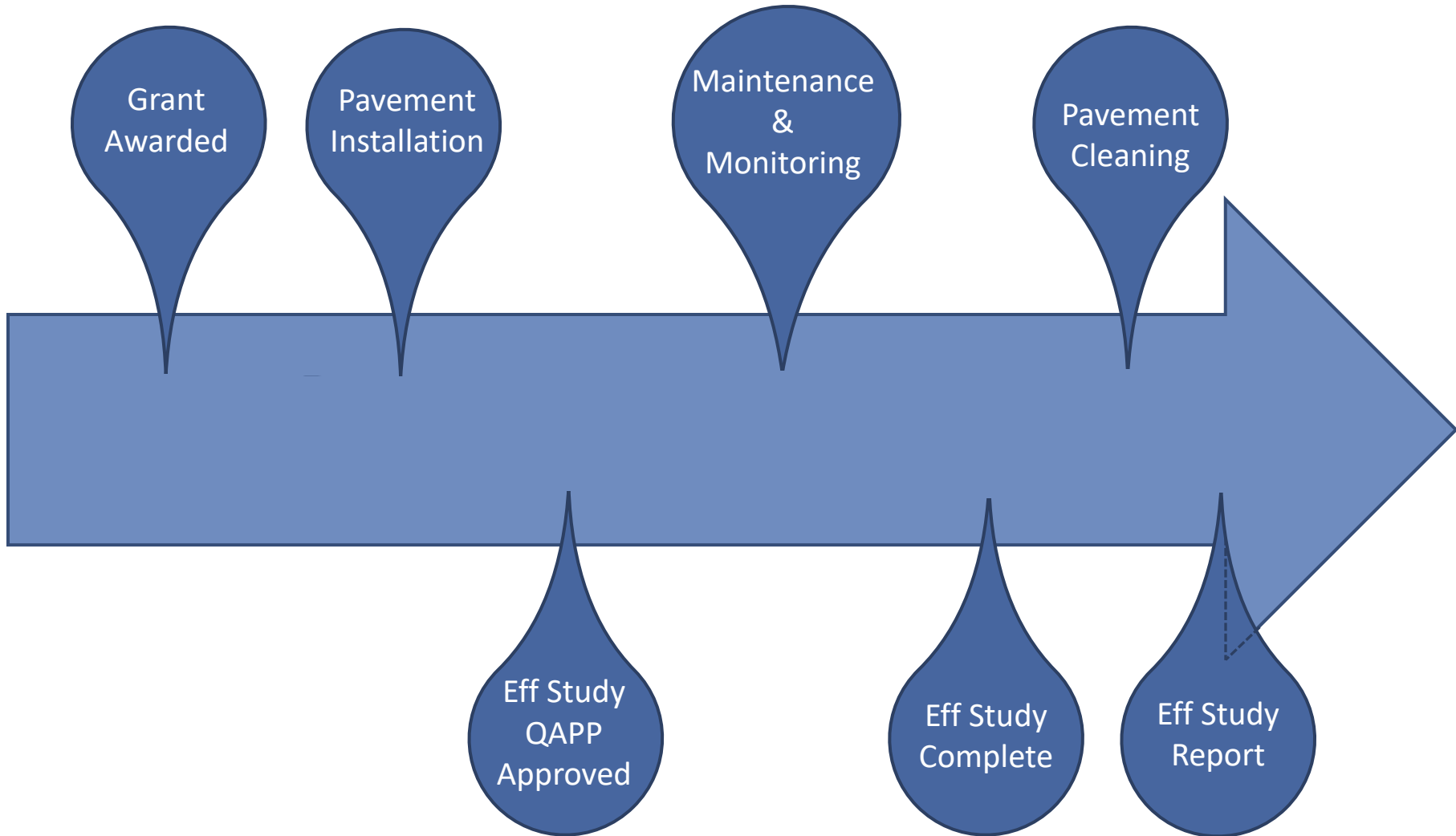


# Overview

- Background / Refresher information
- Pavement Condition Index
- Pavement maintenance
- Infiltration data
- Pollutant removals
- Summary

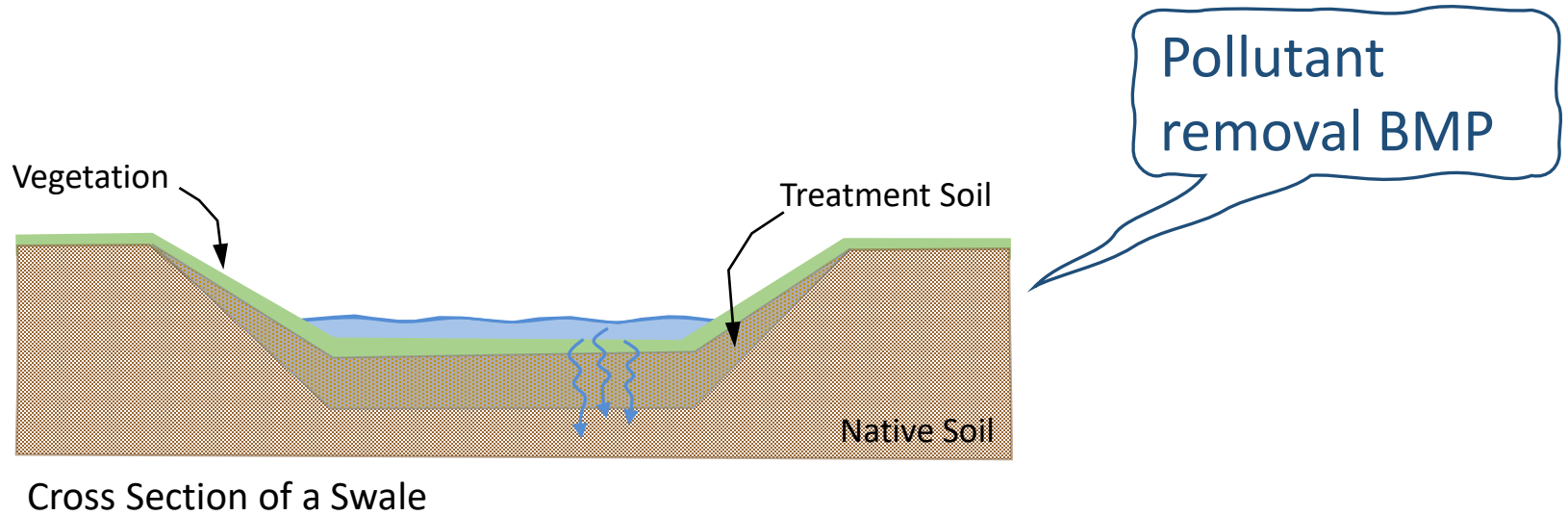
# **Background Information**

# Project Timeline

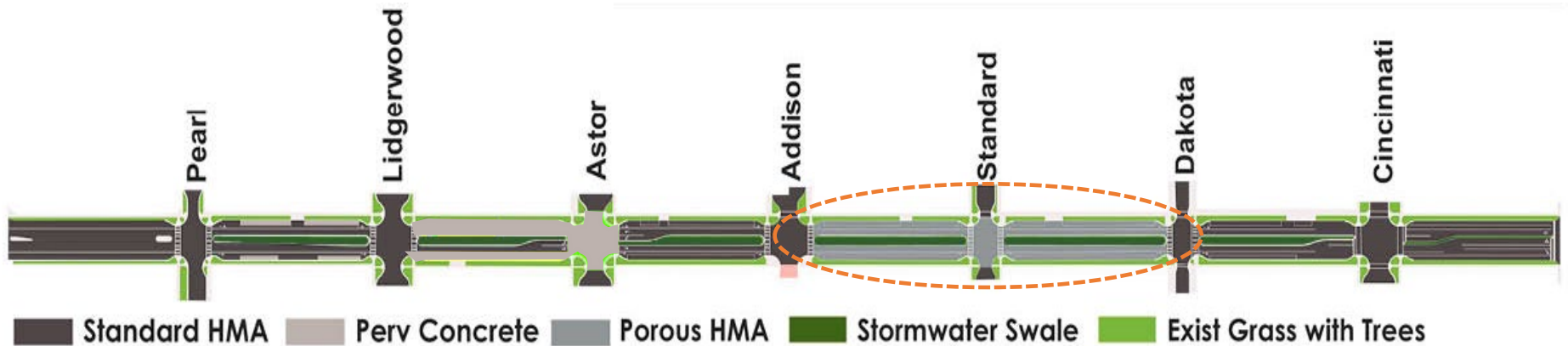
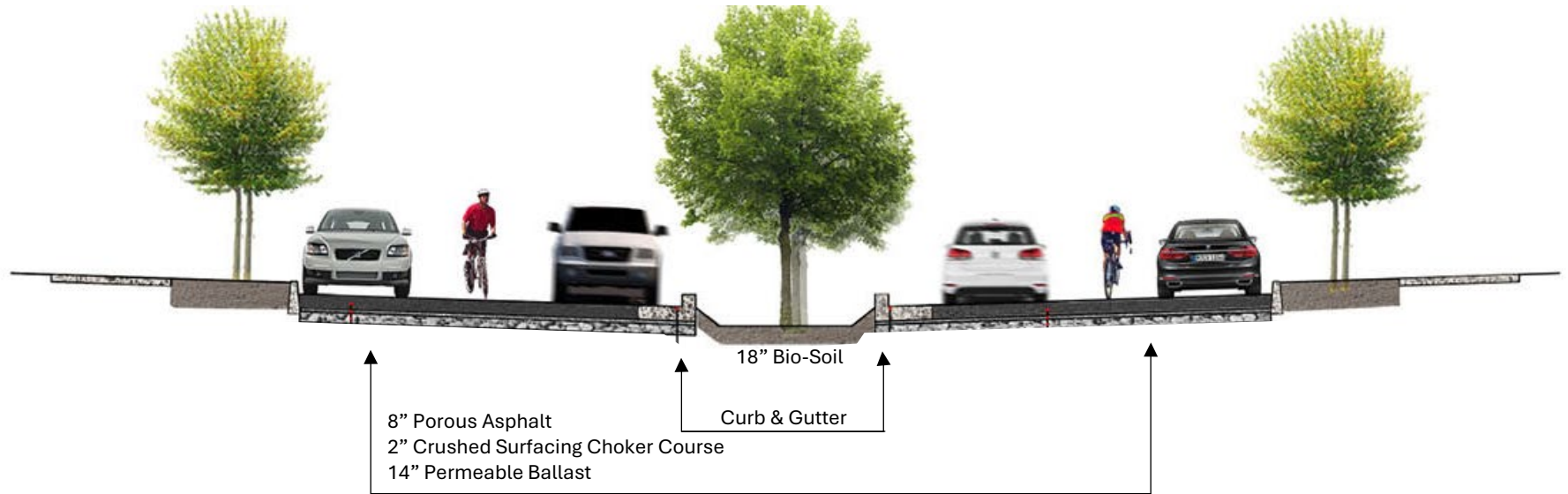




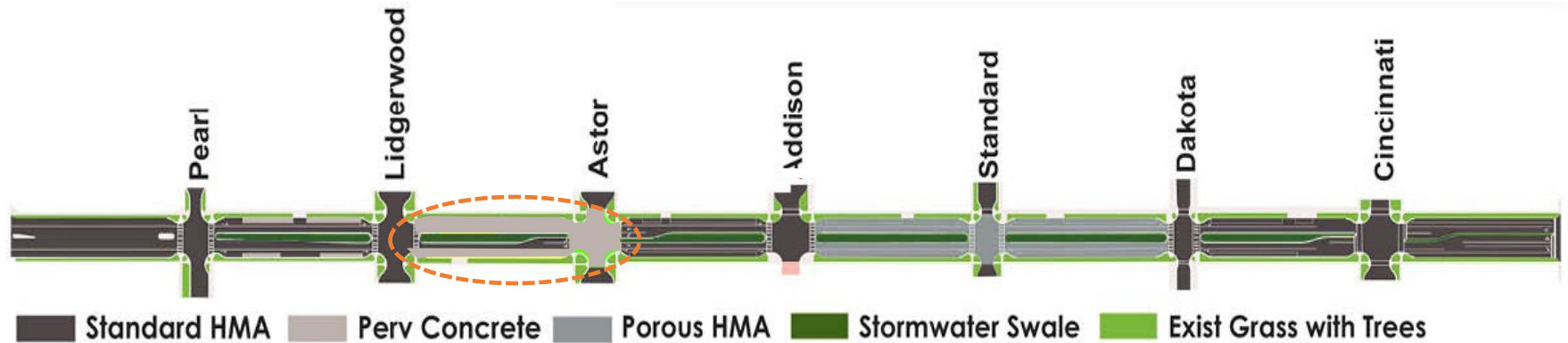
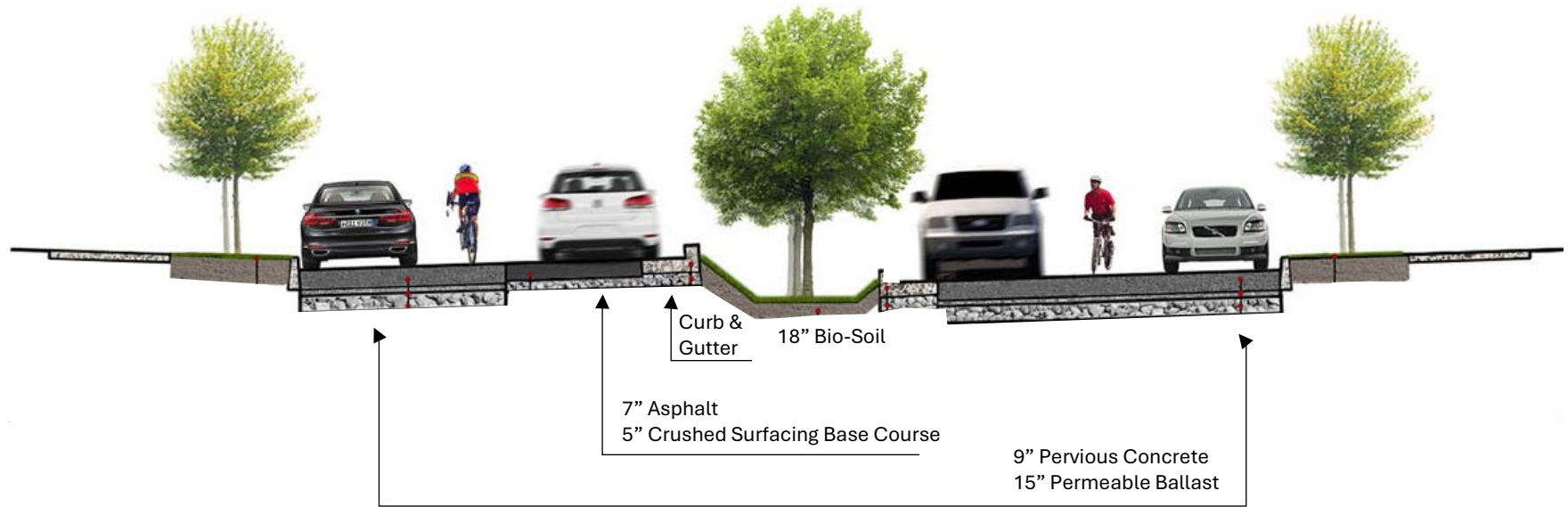
# Stormwater Treatment



# Porous Asphalt Cross Section



# Pervious Concrete Cross Section

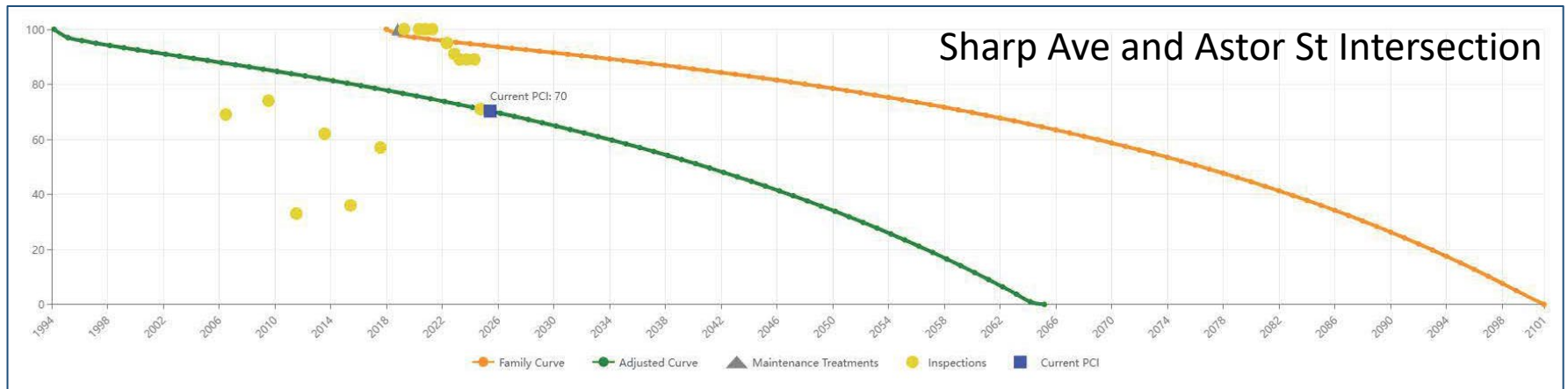
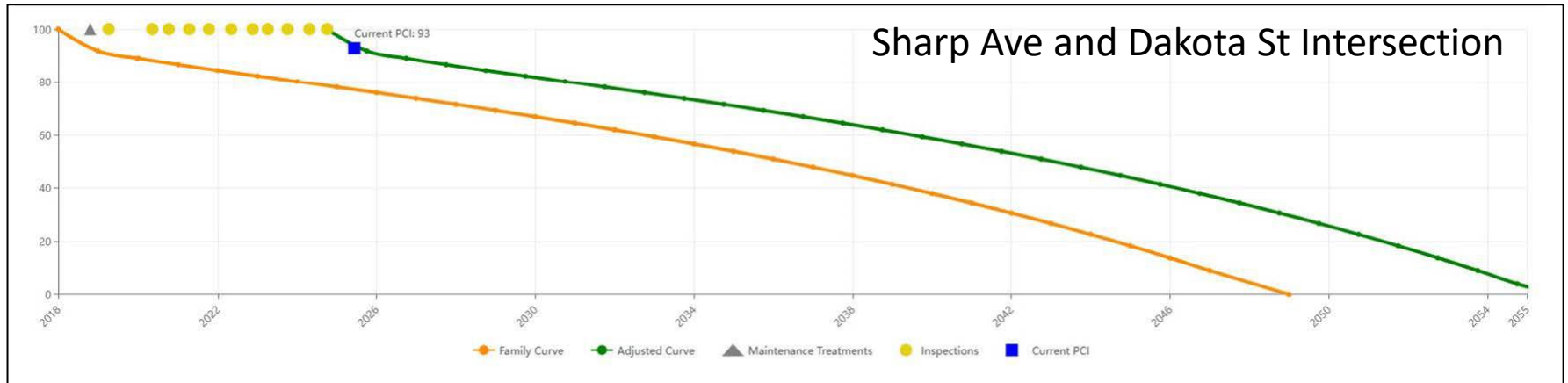


# Pavement Condition Index\*

Pavement	Comments	Apr-19	Oct-20	Oct-21	Nov-22	Oct-23	Oct-24
Pervious Concrete (EB Parking)	Edge Cracking	100	100	100	100	100	98
Pervious Concrete (WB Lane & Parking)	2 Linear Cracks	98	98	96	90	84	84
Pervious Concrete (Intersection)	6 Light Linear Cracks 3 Light Patches 10 Medium Scaling	100	100	100	95	89	89
Porous Asphalt (WB Lane)	Light Rutting	100	82	82	79	79	79
Porous Asphalt (EB Lane)	Light Rutting	100	82	82	79	79	81
Asphalt (Lanes & Intersections)	--	100	100	100	100	100	100

\* PCI is the numerical index (0-100) used to indicate the general condition of a pavement section.

# PCI Projection Curves





# PCI Survey Observations



Linear Cracks



Light Rutting



Unraveling



Spalling

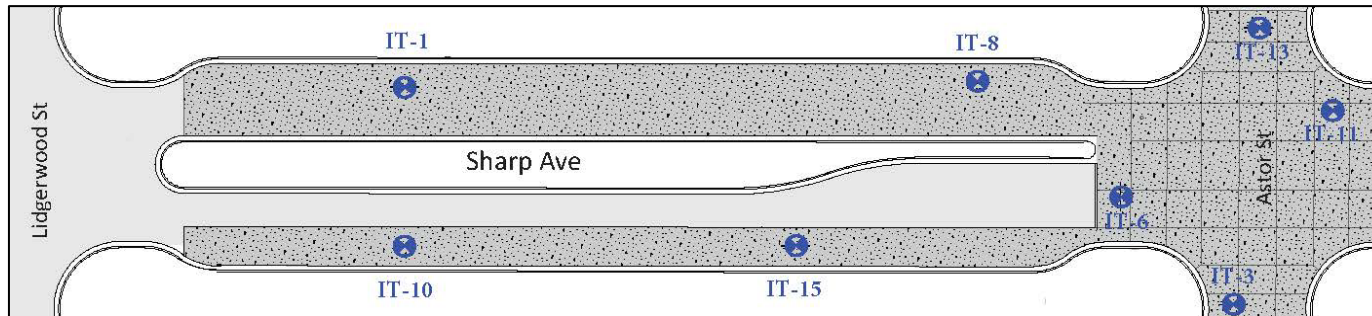
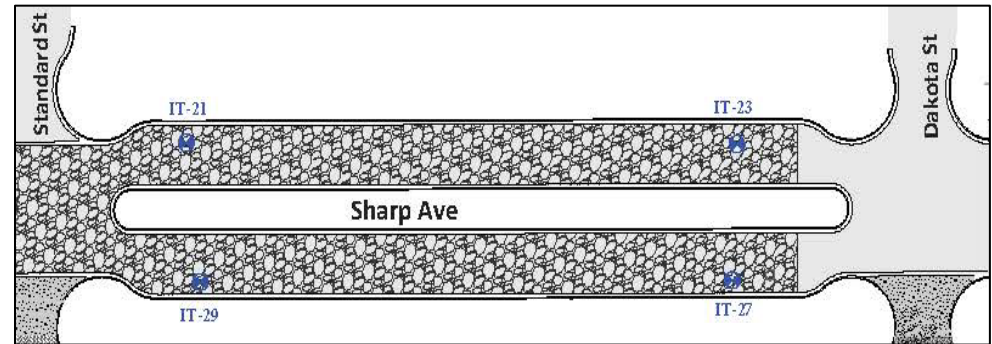
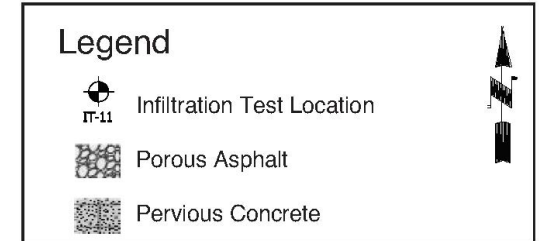
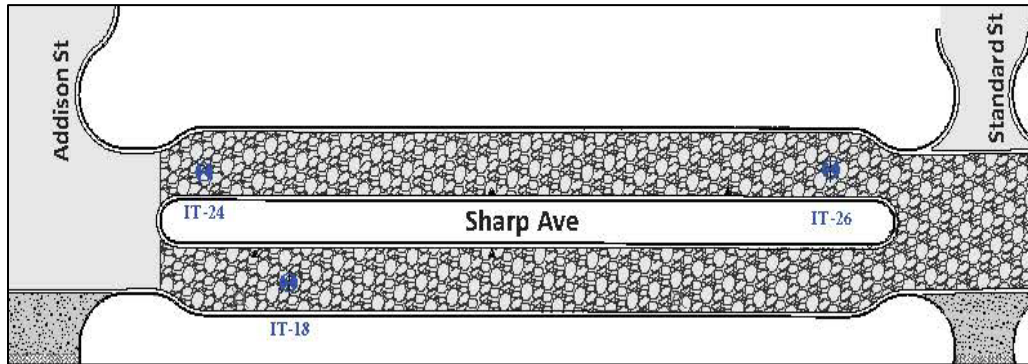
# Recent Maintenance

- Specialized equipment
  - High Pressure Water Jets
  - High Suction Vacuum
  - Similar equipment used on Navy aircraft carriers
- Maintenance contract
  - 5 day estimate for ~49,000 sq ft
  - 100 in/hr infiltration criteria
  - Wastewater Department support
- Results
  - Cleaning rate  $\approx 1000 \text{ ft}^2/\text{hr}$
  - Cleaning cost  $\approx \$0.60 / \text{ft}^2$



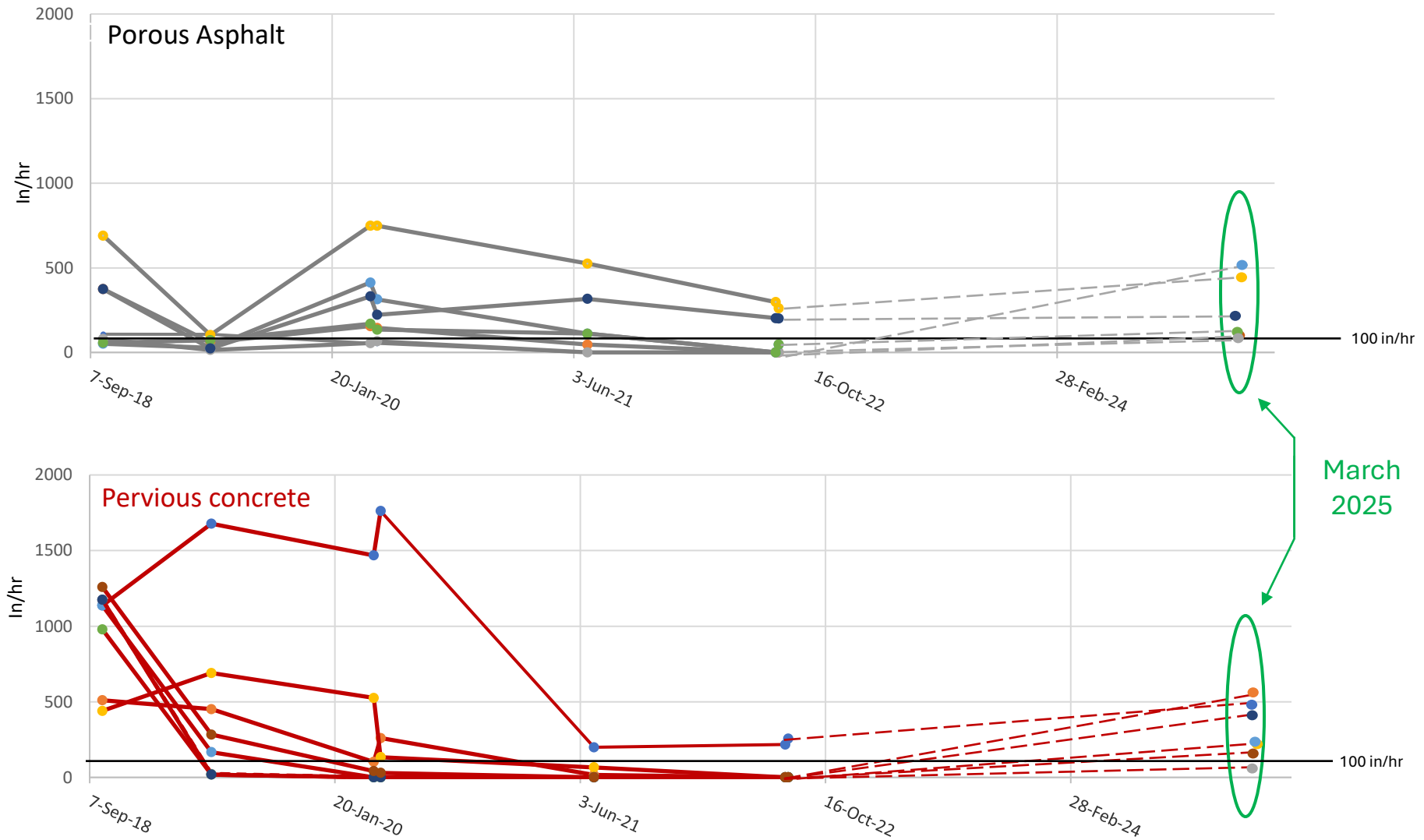


# Infiltration Test Locations





# Infiltration Rates



# Pollutant Percent Removals

	DRO	ORO	Total P	TSS	As	Cd	Ca	Cr	Cu	Pb	Mg	Zn
Pervious Concrete	0.07	-0.12	0.84	0.52	-11.88	0.66	0.64	-8.38	-0.74	0.27	0.62	0.94
	-1.50	-1.27	0.50	-0.96	-13.59	0.65	0.70	-8.45	-1.49	-1.55	0.56	0.31
	--	--	--	--	-6.30	0.99	0.10	-0.54	0.28	0.79	0.90	0.97
	-1.09	0.18	0.68	0.78	-1.87	0.85	-3.77	-2.13	-3.20	0.87	1.00	0.98
	0.23	0.58	0.71	0.80	-1.04	0.57	0.71	0.08	0.44	0.74	0.80	0.78
	0.07	0.68	0.57	0.87	-2.96	0.79	-0.07	-0.69	0.41	0.74	0.64	0.95
	-0.02	0.37	0.47	0.48	-2.60	0.40	0.16	-0.84	-0.05	0.42	0.42	0.83
	-0.09	0.56	0.68	0.72	-3.46	0.14	0.63	-1.20	-0.19	0.57	0.52	0.89
	0.27	0.70	0.91	0.98	-3.23	0.82	0.34	-2.97	0.37	0.97	0.02	0.98
	0.21	0.37	0.82	0.71	-4.70	0.75	0.60	-1.01	0.15	0.53	0.55	0.94
	0.67	0.09	0.88	0.97	-4.82	0.06	-1.13	-3.22	0.25	0.96	-0.05	0.97
	0.57	0.02	0.22	0.86	-5.57	0.75	0.50	-9.56	-1.31	0.84	-0.17	0.92
	--	--	-0.62	0.89	-13.32	-4.29	0.19	-10.36	-0.99	0.85	-0.81	0.88
	-0.11	0.84	0.93	0.81	-0.90	0.71	-2.26	0.10	0.61	0.90	0.44	0.96
	-0.04	-0.03	0.45	0.90	-6.23	-0.75	0.10	-4.53	-0.34	0.65	-0.68	0.81
Porous Asphalt	0.17	0.58	0.86	0.10	-6.14	0.66	-0.83	-7.15	0.01	0.95	-2.42	0.99
	-0.25	0.53	0.74	0.71	-6.71	0.91	-0.53	-9.26	-0.14	0.71	-2.15	0.96
	--	--	--	--	-3.00	0.99	-1.52	0.13	0.72	0.72	-0.06	0.94
	0.08	0.05	0.48	0.82	-3.76	0.66	-2.11	-5.54	0.23	0.71	0.21	0.98
	0.62	-0.05	0.81	0.47	-5.53	0.81	-0.37	-4.87	-0.36	0.41	-0.56	0.97
	0.15	0.71	0.28	0.97	-4.54	0.70	-3.63	-0.62	0.14	0.89	-1.89	0.94
	-0.48	-0.17	-0.29	0.38	-4.18	-2.60	-0.88	-0.43	-0.31	0.39	-1.27	0.70
	-0.31	-0.04	0.59	0.24	-3.10	-0.14	0.28	-0.68	-0.52	0.30	-0.42	0.74
	-0.61	-0.30	0.61	0.57	-8.13	-0.05	-0.10	-0.23	-0.98	0.17	-0.83	0.78
	0.67	0.09	0.64	0.86	-7.25	0.32	-2.56	-0.86	0.12	0.85	-3.47	0.93
	0.52	-0.05	-2.30	-1.44	-5.45	0.65	0.16	-1.77	-1.75	0.55	-1.96	0.83
	-0.13	-0.16	0.48	0.42	-8.74	-1.88	-0.01	-1.48	-0.97	-0.33	-1.59	0.59

# Sharp Avenue Project Summary

- Permeable pavements manage stormwater occurrence
  - Inherently plug with sediment
  - Requires active maintenance with specialized equipment
- Treats stormwater effectively for some pollutants
  - Lead
  - Zinc
  - TSS
  - Phosphorous
- Permeable pavement viability
  - Varies by pavement type and application
  - Challenged on arterials
  - Viable in low traffic areas
    - Parking lanes, parking lots, and bike lanes (or similar)

