Cochran Basin Stormwater

Taking the Design Storm Offline

Spokane River Forum 2023 Conference

April 27, 2023

Overview

- CSO vs MS4
- Background
- Stormwater permit/TMDL requirement
- Cochran Basin Project

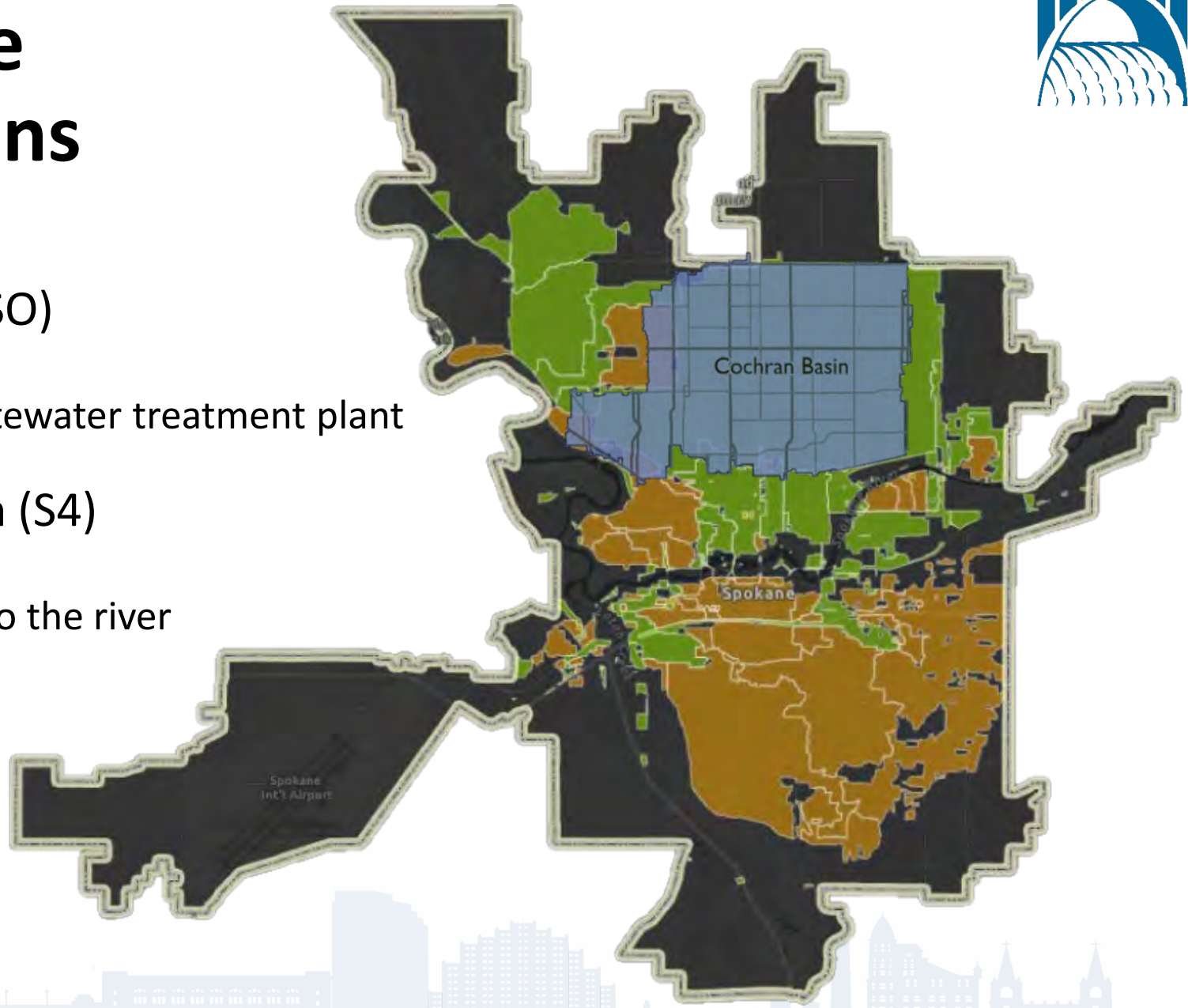
City of Spokane Stormwater Basins

Combined Sewer Overflow (CSO)

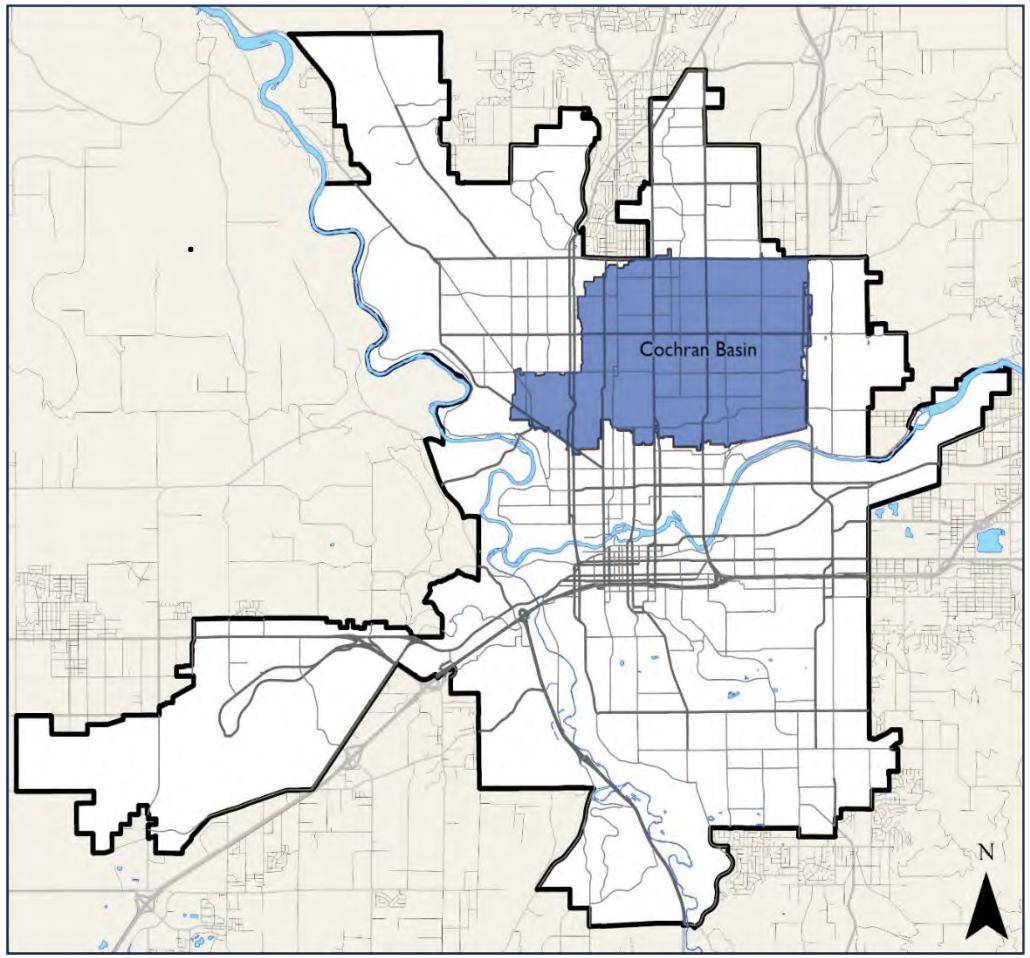
- Older infrastructure
- Stormwater conveyed to the wastewater treatment plant

Separate Storm Sewer System (S4)

- Newer infrastructure
- Stormwater discharges directly to the river

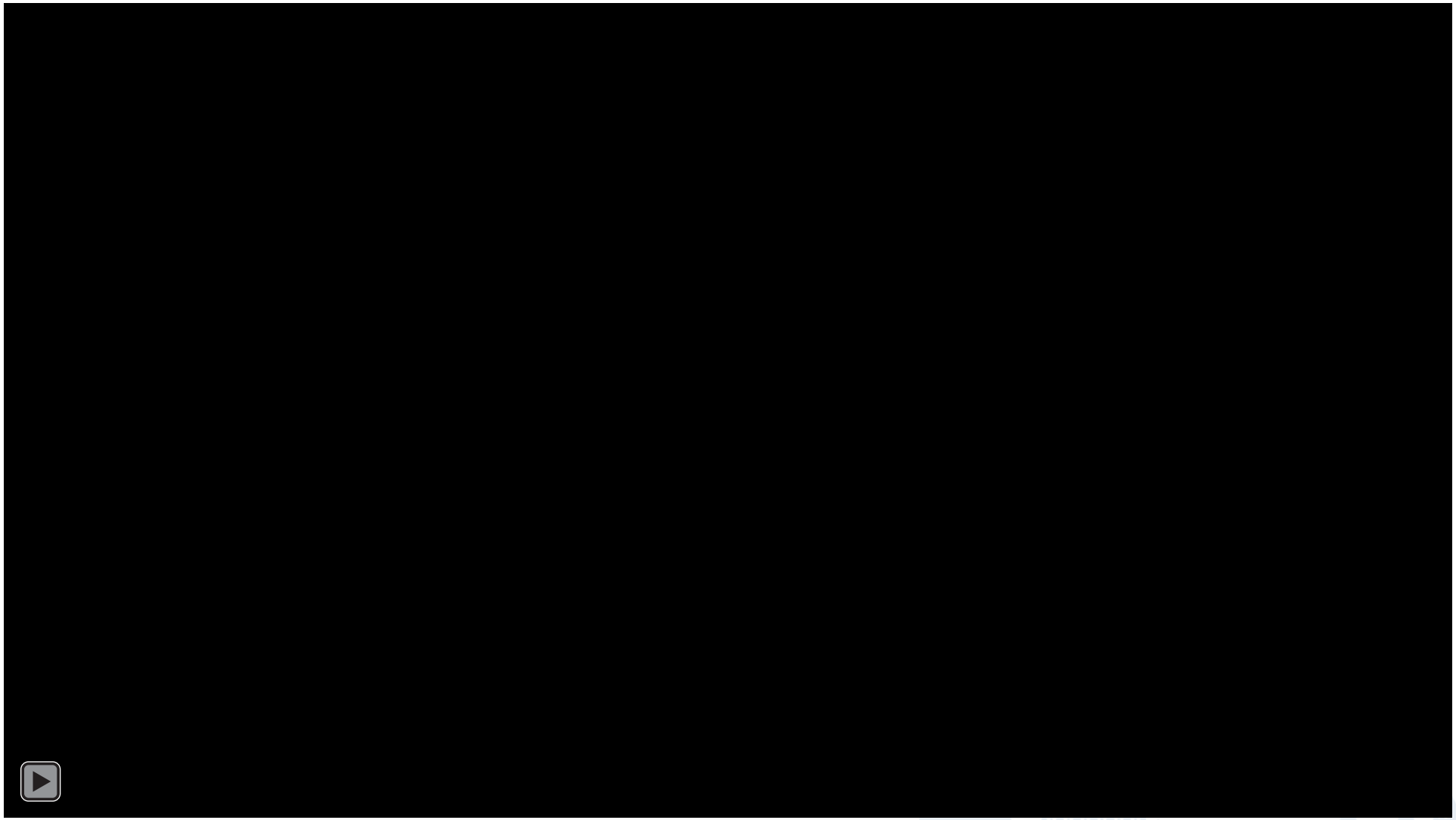


Cochran Basin Background



- Largely residential, minor commercial and light industrial land uses
- Largest stormwater basin in the City of Spokane
- Comprises 62% of the City's MS4
- 5,328 acres in size
- 26% impervious surfaces
- Basin currently discharges untreated stormwater to the Spokane River

View of Cochran Basin

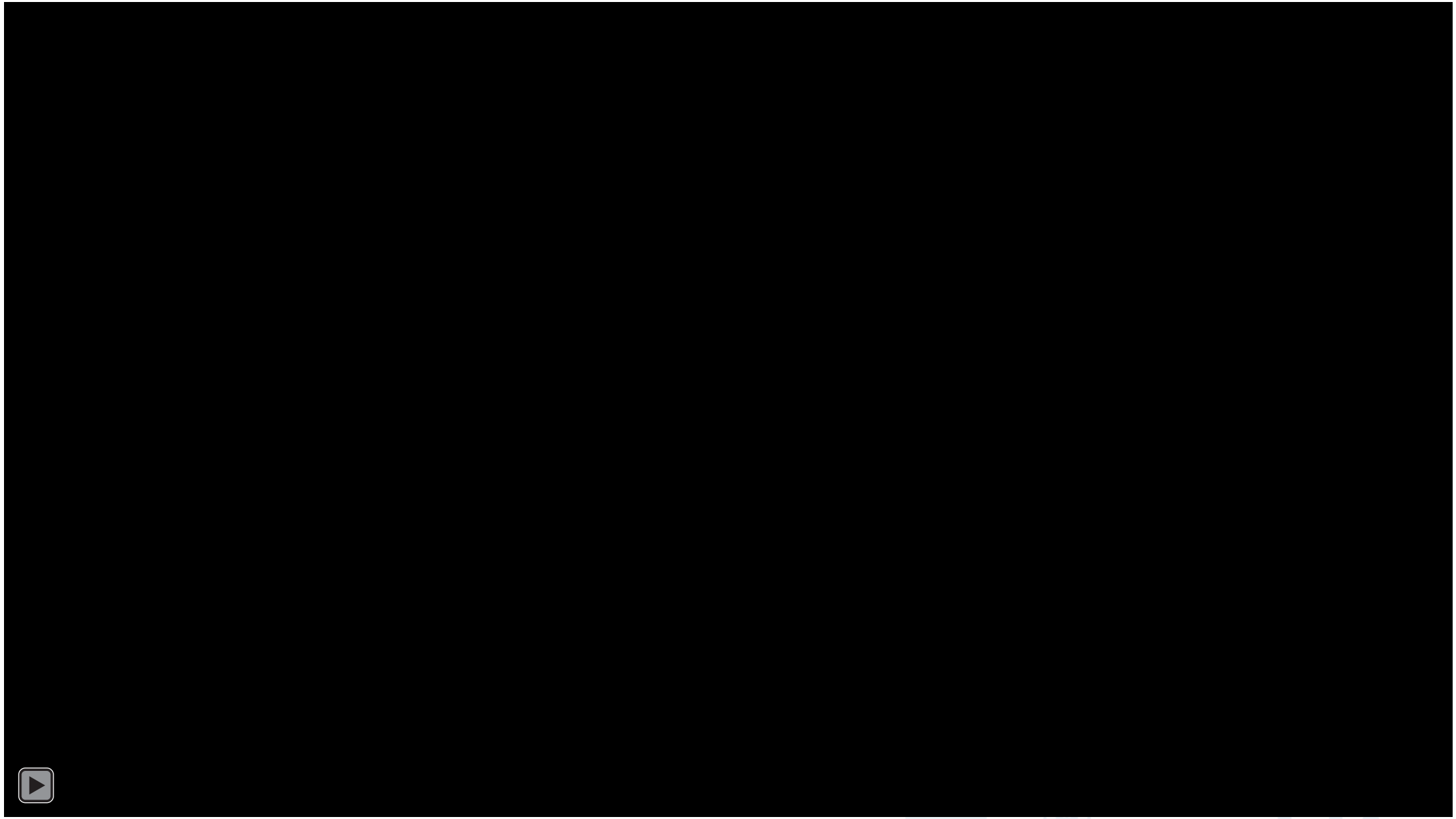


Phase II Municipal Stormwater Permit

- City of Spokane stormwater is regulated under the Eastern Washington Phase II Municipal Stormwater Permit , *which states:*

  "The City of Spokane…shall…implement the Appendix 2 TMDL monitoring program… Stormwater shall be monitored for phosphorus, ammonia, CBOD, and flow rates…"

- Cochran Basin is monitored as a proxy for the MS4 areas of the City of Spokane



Cochran Basin Discharge Volumes

	2016 Discharges (MG)	2017 Discharges (MG)	2018 Discharges (MG)	2019 Discharges (MG)	2020 Discharges (MG)	2021 Discharges (MG)
Annual Total Discharge	227.77	248.61	158.02	200.63	106.52	82.63
Annual Stormflow*	225.38	209.92	106.09	178.02	103.09	80.82
Annual Baseflow*	2.39	38.69	51.93	22.65	3.43	1.81
Seasonal Baseflow	165.43	106.51	66.77	143.50	61.80	27.87
Seasonal Stormflow*	163.16	103.69	38.03	122.58	60.77	27.00
Seasonal Baseflow*	2.27	2.82	28.74	20.92	1.04	0.88

TMDL Waste Load Allocations

Point Source Discharge	2027 Projected Flow Rates (MGD)[1]	NH3-N		TP		$CBOD_6$[2]	
		mg/L	lbs/day (WLA)	mg/L	lbs/day (WLA)	mg/L	lbs/day (WLA)
Liberty Lake	1.5	variable[3]	variable[3]	0.036	0.45	3.6	45.1
Kaiser[4]	15.4	0.07	9.0	0.025	3.21	3.6	462.7
Inland Empire Paper Company	4.1	0.71	24.29	0.036	1.23	3.6	123.2
City of Spokane	50.8	variable[3]	variable[3]	0.042	17.81	4.2	1780.6
Spokane County (new plant)	8	variable[3]	variable[3]	0.042	2.80	4.2	280.4
Stormwater[5]	2.36	0.05	0.98	0.310	6.1	3.0	59.1
CSO	0.12	1.0	1.0	0.95	0.95	30.0	30.0

Source: Spokane River and Lake Spokane Dissolved Oxygen Total Maximum Daily Load: Water Quality Improvement Report(Publication #07-10-073)

Stormwater Runoff Waste Load

Calculate Stormflow Median Pollutant Waste Load

- *Stormflow* volumes and median pollutant concentrations from qualifying storm samples.

Calculate Baseflow Median Pollutant Waste Load

- *Baseflow* volumes and the median pollutant concentrations from baseflow after 48 hours of no rain.

Calculate Stormwater Runoff Median Pollutant Waste Load

- Stormwater runoff pollutant waste load is equal to the difference between the *stormflow* pollutant waste load and the *baseflow* pollutant waste load.

Cochran Basin Stormwater Runoff Waste Loads

	Year	CBOD (lbs/day)	TP (lbs/day)	NH3-N (lbs/day)
Seasonal Stormwater Runoff Waste Load	2016	49.7	1.1	0.14
	2017	45.7	3	0.00+
	2018	7.8	0.4	0.05
	2019	26.4	1.3	0.99
	2020	21.1	0.6	0.06
	2021	4.4	0.2	0.07
Annual Stormwater Runoff Waste Load	2016	46.2	1	0.13
	2017	78.1	2.2	0.00+
	2018	15.9	0.6	0.3
	2019	52.8	1.5	0.88
	2020	19.2	1.3	0.6
	2021	13.1	0.7	0.20
Stormwater WLA*		59.1	6.1	1.00

City of Spokane
Stormwater Pollutant Waste Loads

	Year	CBOD (lbs/day)	TP (lbs/day)	NH3-N (lbs/day)
Seasonal Median Stormwater Waste Load	2016	**79.5**	1.8	0.22
	2017	**73.1**	4.8	0.00*
	2018	12.5	0.6	0.08
	2019	42.2	2.1	**1.58**
	2020	33.8	1.0	0.10
	2021	7.0	0.4	0.11
Annual Median Stormwater Waste Load	2016	**73.9**	1.6	0.21
	2017	**125.0**	3.5	0.00*
	2018	25.4	1.0	0.48
	2019	**84.5**	2.4	**1.41**
	2020	30.7	2.1	0.96
	2021	21.0	1.1	0.32
Stormwater WLA*		59.1	6.1	1.00

Bold values indicate that the calculated waste load was greater than the Waste Load Allocation

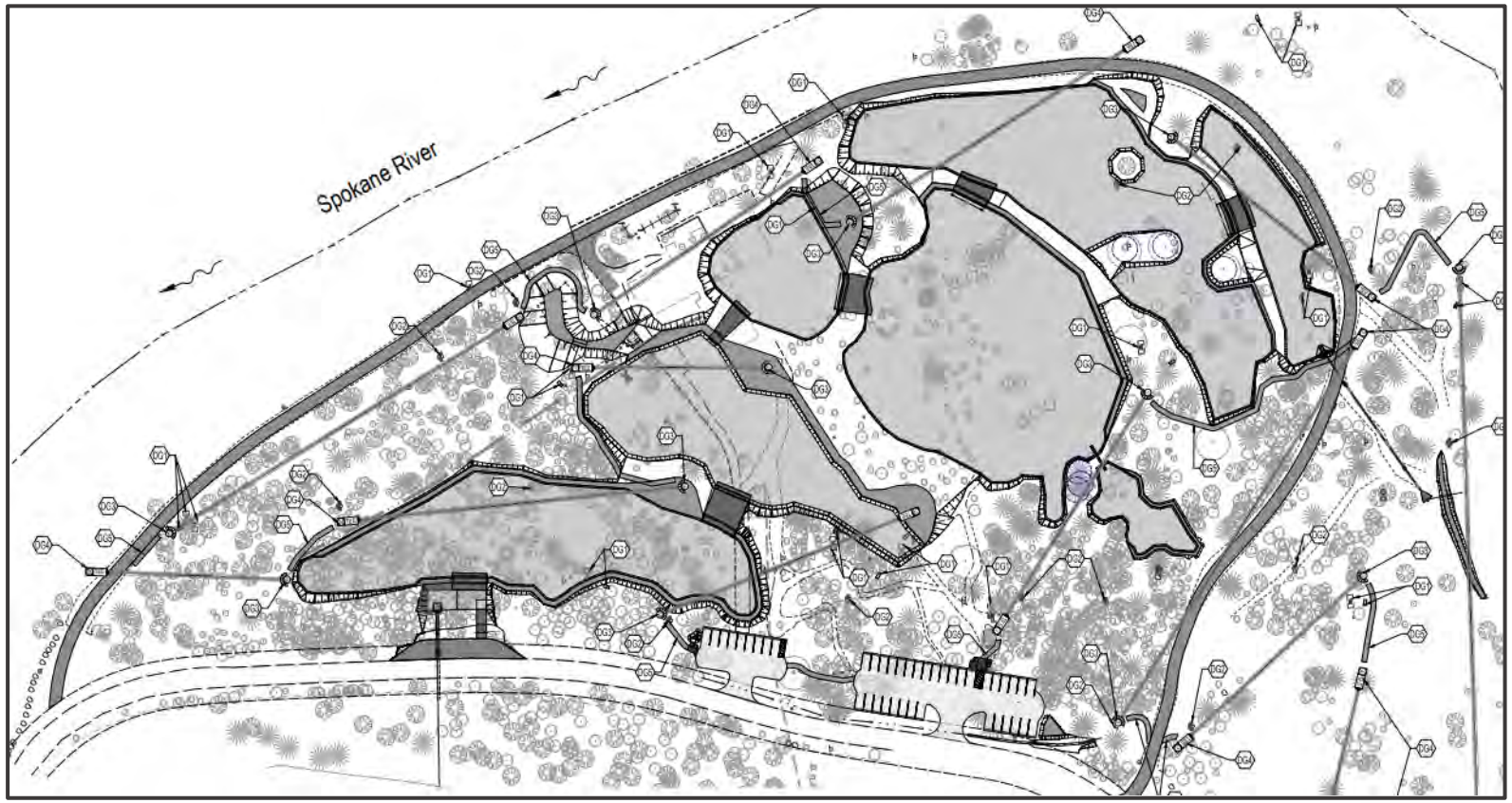
* Use multiplier of 1.6 to Cochran Basin Proxy Data for City of Spokane Waste Load

Cochran Basin Stormwater Facilities Plan

Stormwater conveyed to three treatment areas designed to the Type IIA 6-month storm

1. Disc Golf Course
2. Boat Launch
3. TJ Meenach Swales
4. Control Vault

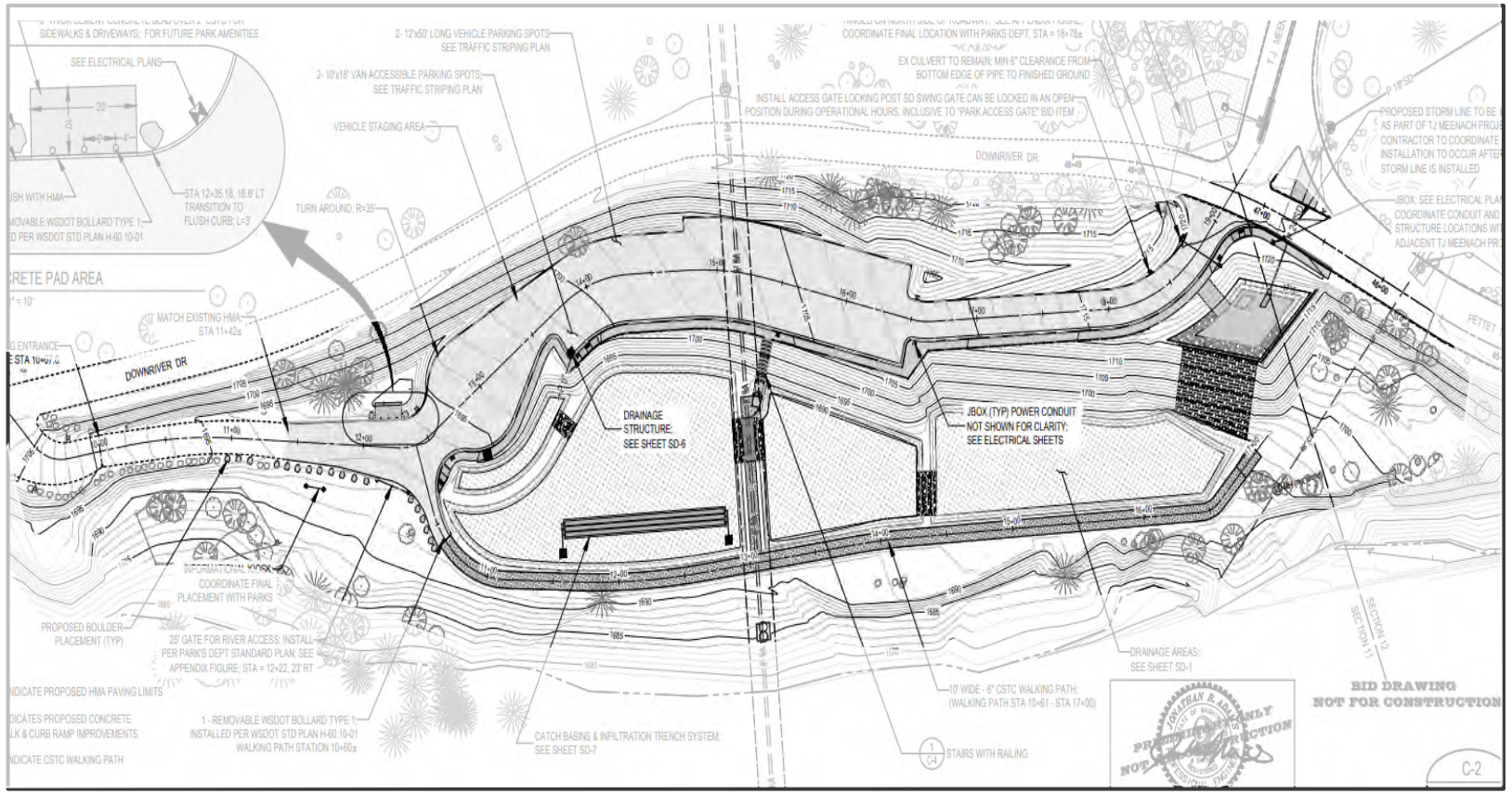
Disc Golf Treatment Facility



- Multi-use Green Stormwater Infrastructure Facility
- Layout consistent with with PDGA guidelines
- Designed in accordance with Ecology bioretention standards
- Roughly 16 acres total
- Approximately 13 acres total with 4.29 acres of treatment areas
- Currently under construction

Disc Golf Treatment Facility

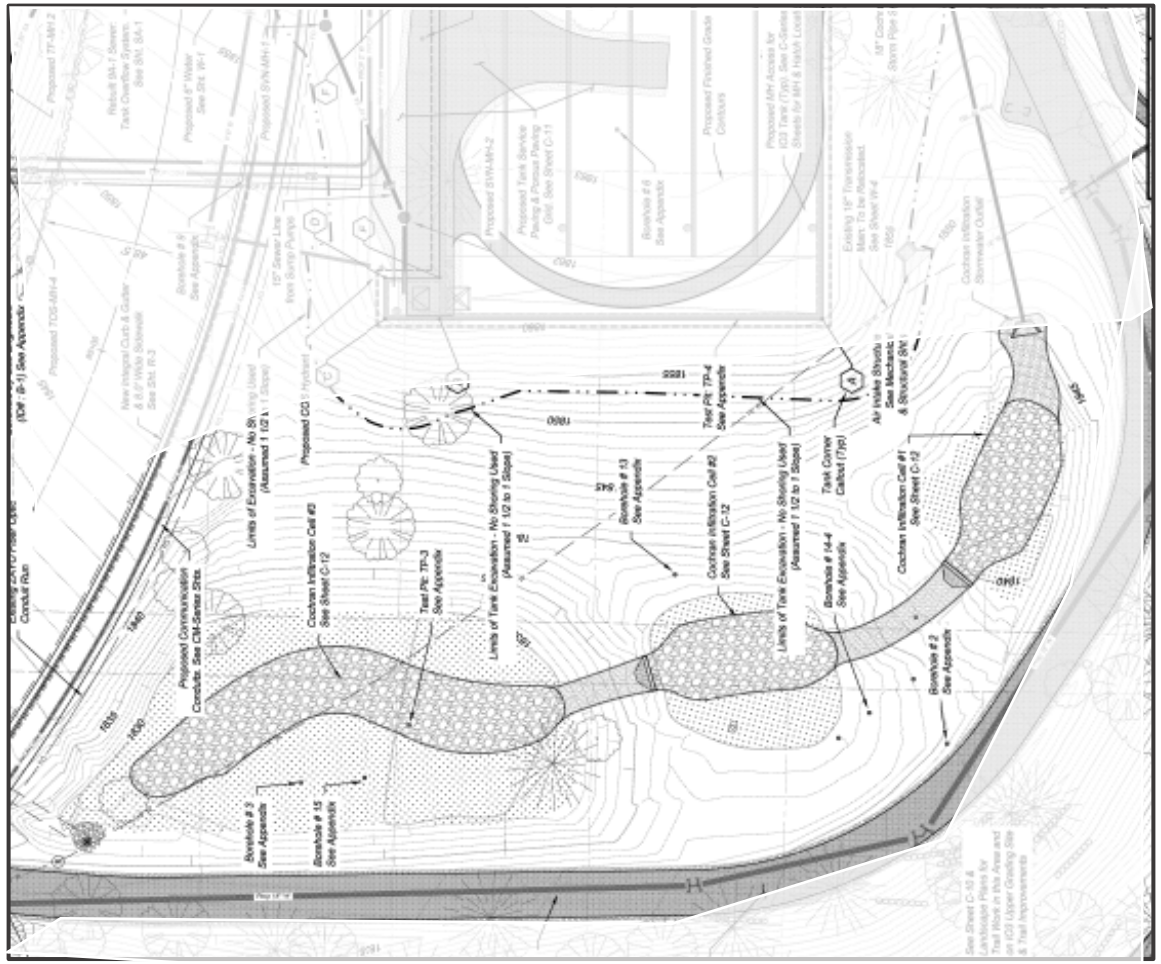
Boat Launch Treatment Facility



- Multi-use Green Stormwater Infrastructure Facility
- Improved river access
- Designed in accordance with Ecology bioretention standards
- Roughly 2 acres total with 0.4 acres of treatment areas
- Currently under construction

Boat Launch Treatment Facility

TJ Meenach Treatment Facility



- Multi-use Green Stormwater Infrastructure Facility
- Improved river access
- Designed in accordance with Ecology bioretention standards
- Roughly 2 acres total with 0.4 acres of treatment areas
- Currently under construction

TJ Meenach Treatment Facility

- Green Stormwater Infrastructure Facility
- Strategically located over permeable subsurface
- Designed in accordance with Ecology bioretention standards
- Roughly 1 acre total with 9,000 ft^2 of treatment area
- Currently under construction


SPOKANE
STORMWATER
TREATMENT IMPROVEMENTS
AT COCHRAN BASIN

Thank You

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