Blue Plains AWWTP and Clean Rivers Project

EPA Tour
03 May 2023

Nicholas Passarelli, Vice President Wastewater Treatment

Who We Are
The District of Columbia Water and Sewer Authority (DC Water)

DC Water Overview

Provides

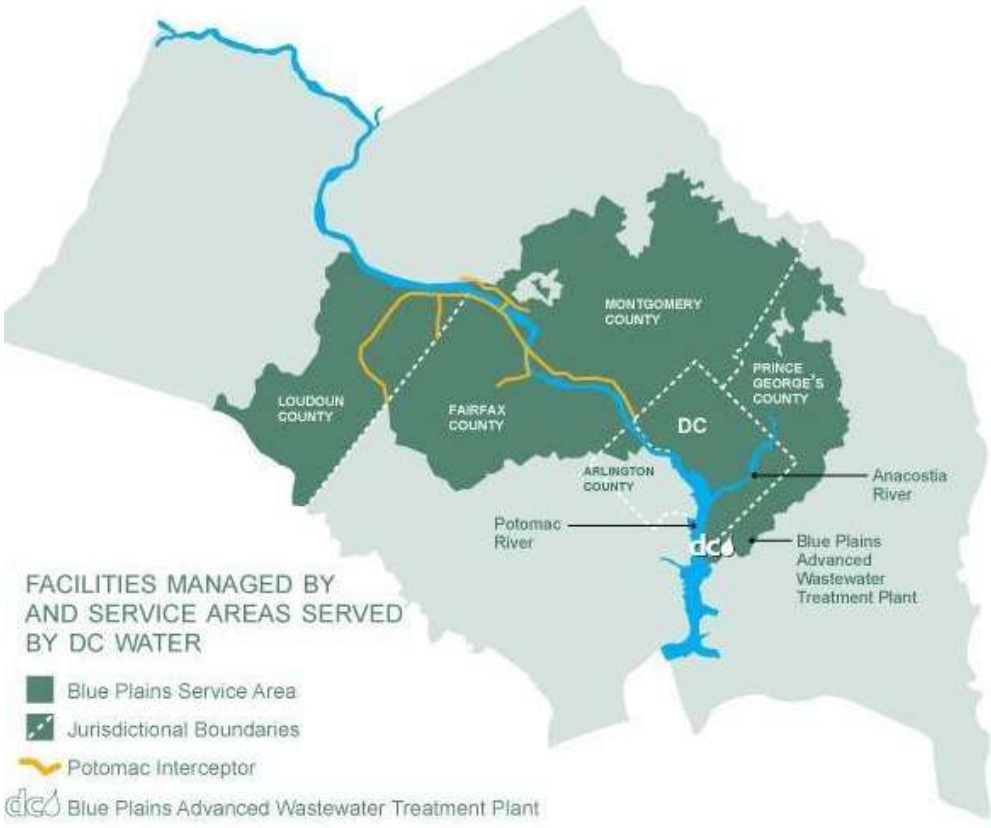
- Drinking water distribution for DC
- Sanitary wastewater conveyance and treatment
- Combined sewer conveyance and treatment

Treats wastewater for a population of 2.4 million

- District of Columbia
- Montgomery & Prince George's Counties, MD
- Fairfax & Loudoun Counties, VA

Operates the world's largest Advanced Wastewater Treatment Plant

- Average daily capacity, 384 mgd
- Peak daily capacity, 780 mgd
- Serves a regional area of approximately 725 Sq Mi



Beyond Stringent Permit Requirements

Parameter	Discharge Limitations		Performance 2022
	Avg. Monthly	Avg. Weekly	
TSS	6.1mg/L	No Limit	0.92
$CBOD_5$	5.0 mg/L	7.5 mg/L	1.25
TP	0.17 mg/L	0.34 mg/L	0.11
$NH_{3\ (summer)}$	4.1 mg/L	6.1 mg/L	0.16 (Annual avg.)
$NH_{3\ (winter\ 11/1-2/14)}$	12.8 mg/L	19.3 mg/L	
$NH_{3\ (winter\ 2/15-4/30)}$	10.3 mg/L	15.4 mg/L	
DO (min daily)	5 mg/L		6.70 (min daily anytime) 9.4 (min daily avg.)
pH	6-8.5		$pH_{(min)}$ 6.2; $pH_{(max)}$ 6.8
E. Coli	126 cfu/100mL *		1.5
Chlorine Residual	Non-detectable		No Violation
Total Nitrogen	4,370,078 lbs/yr (3.74 mg/L)		2,825,879 lbs/yr


Blue Plains AWWTP
Woodrow Wilson Bridge
Potomac River
City of Alexandria
North
Denit Reactors
Filtration & Disinfection
Digesters
Solids Processing Bldg
Nitrification Sedimentation
Dual Purpose Sedimentation
Central Maintenance Facility
Wet Weather Treatment Facility
Nitrification Reactors
West Secondary Sedimentation
West Primary Sedimentation
East Secondary Sedimentation
Secondary Reactors
Raw WW Pumping Station & Grit Chamber 1
I-295
Grit Chamber Bldg 2
Raw WW Pumping Station 2
East Secondary Sedimentation
Warehouse & Visitors Center
Naval Research Lab
Central Operations Facility

Process Performance Overview: *Liquids Treatment*

Primary

Secondary

Nitrification & Denitrification

Filtration & Disinfection

Plant Influent	
TSS	170 - 240
cBOD	140 - 220
TN	35 - 50
TP	3.5 - 5

Primary Effluent	
TSS	50 - 100
cBOD	80 - 130
TN	30 - 40
TP	1.5 - 2.5

Secondary Effluent	
TSS	15 - 40
cBOD	5 - 30
TN	25 - 30
TP	0.5 - 1.0

Nit-Denit Effluent	
TSS	5 - 10
cBOD	3 - 10
TN	2 - 5
TP	0.1 - 0.2

Final Effluent**	
TSS	0.92
cBOD	1.25
TN	2.4
TP	0.11

DAA0

Monthly Permit Limits on Final Effluent		
Total Suspended Solids	TSS	6.1
Carbonaceous Biochemical Oxygen Demand	cBOD	5
Total Nitrogen (annual load)	TN	~4
Total Phosphorous	TP	0.17

*All values are in mg/L
**Calendar Year 2022 Annual Average

Slide 5

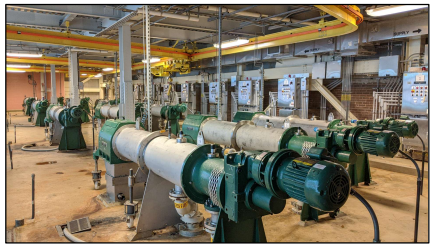
DAA0 [@Nicholas Passarelli] [@Ryu Suzuki] Minor detail. Values were previously for 2019. Conformed to 2022 based on slide 5 values.
Diran A. Adalian, 2023-05-03T14:37:35.143

Process Performance Overview: *Solids Treatment*

Thickening & Blending

Primary Sludge	
dtpd	140 - 170
Secondary Sludge	
dtpd	140 - 170

Fine Screens



Pre-Dewatering

Thermal Hydrolysis

Blended, Screened Sludge	
%TS	3.5 - 6.5

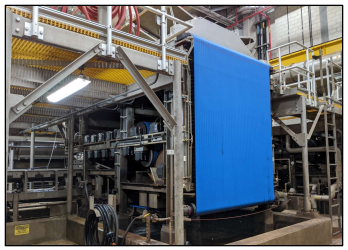
Thickened Cake	
%TS	16 - 18

Steam

Combined Heat and Power

Anaerobic Digestion

Final Dewatering



Land Application

Class A Biosolids	
dtpd	120 - 160
wtpd	380 - 500
%TS	28 - 34

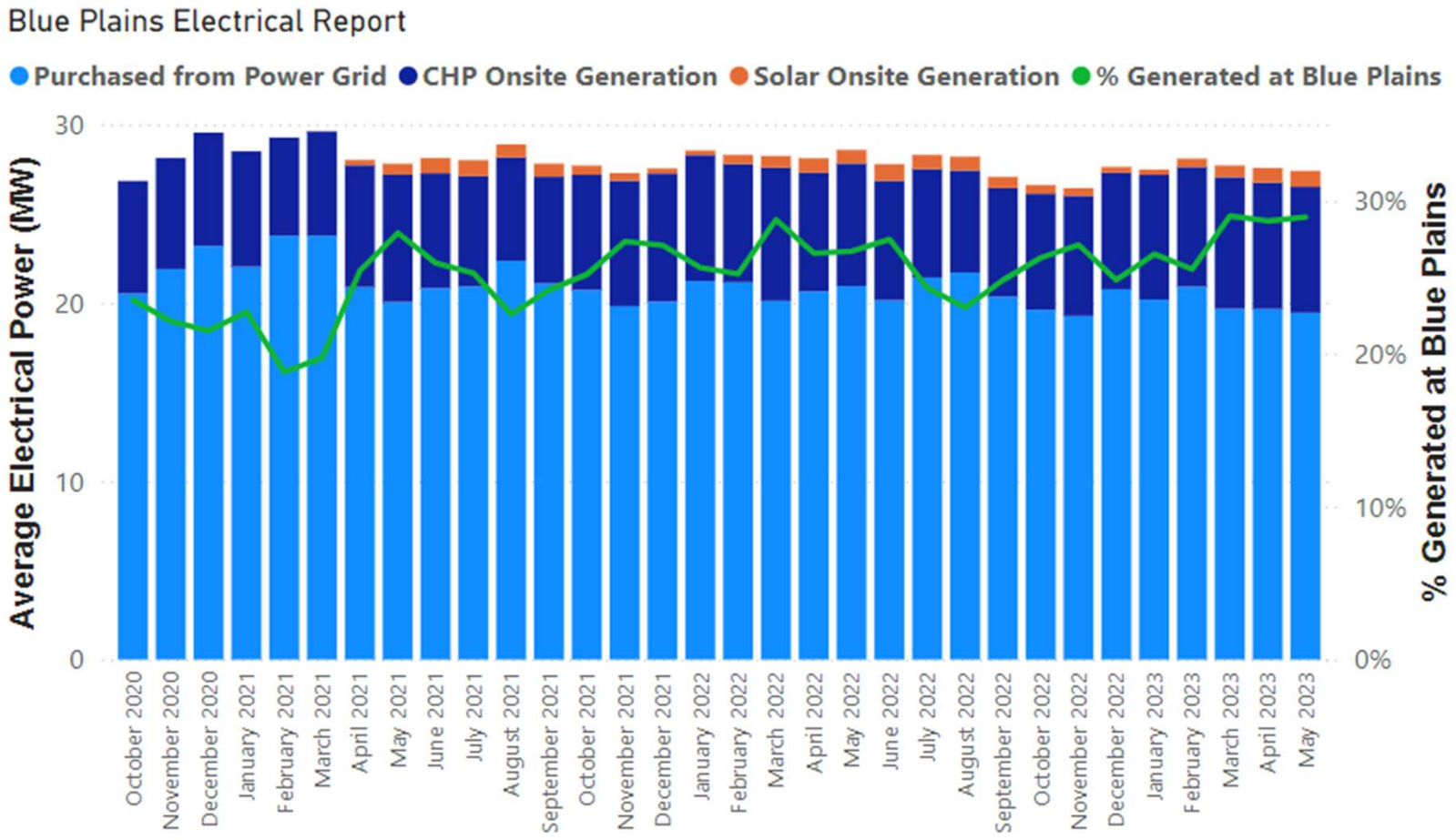
Biogas	
Scfm	2,500 - 3,500

Electricity	
Megawatts	6 - 9

dtpd - dry tons per day
wtpd - wet tons per day
%TS - % total solids
Scfm - standard cubic feet per minute

Renewable Electricity Generation at Blue Plains

- Gas turbine commissioning began in June 2015
- About 25% of plant power demand is produced on site



Bloom Soil Amendment Product

Class B vs Class A Exceptional Quality

There is a market for high quality cake at 31% solids ->

Bloom Products

Fresh Bloom:

- Biosolid straight from process
- Good for farming/industrial application
- Product slinkiness limits use in home gardening

Cured Bloom (100% Bloom):

- Dried/windrowed material
- Granular, easy to use
- Higher nutrient content

Blended Products:

- Wood Blend (OM augmentation)
- Sand Sawdust (texture + OM)

Slide 10

DAA0 [@Chris Peot] [@Nicholas Passarelli] [@Ryu Suzuki] "slinkiness"?
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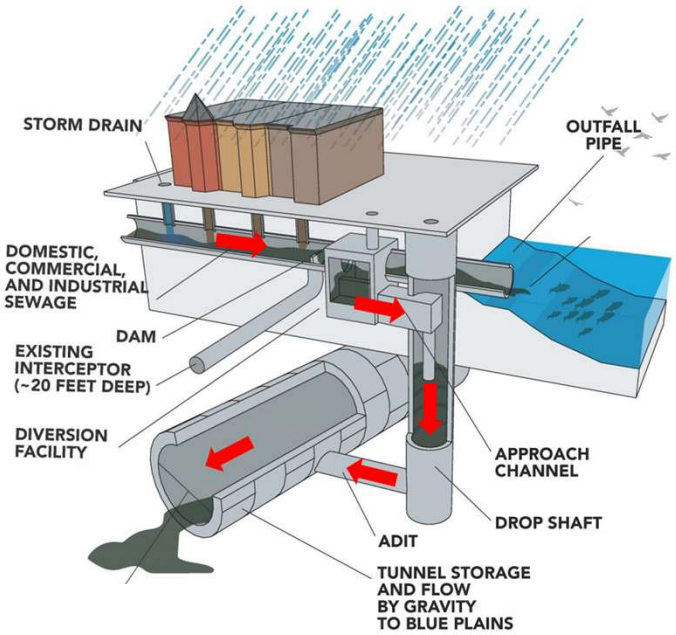
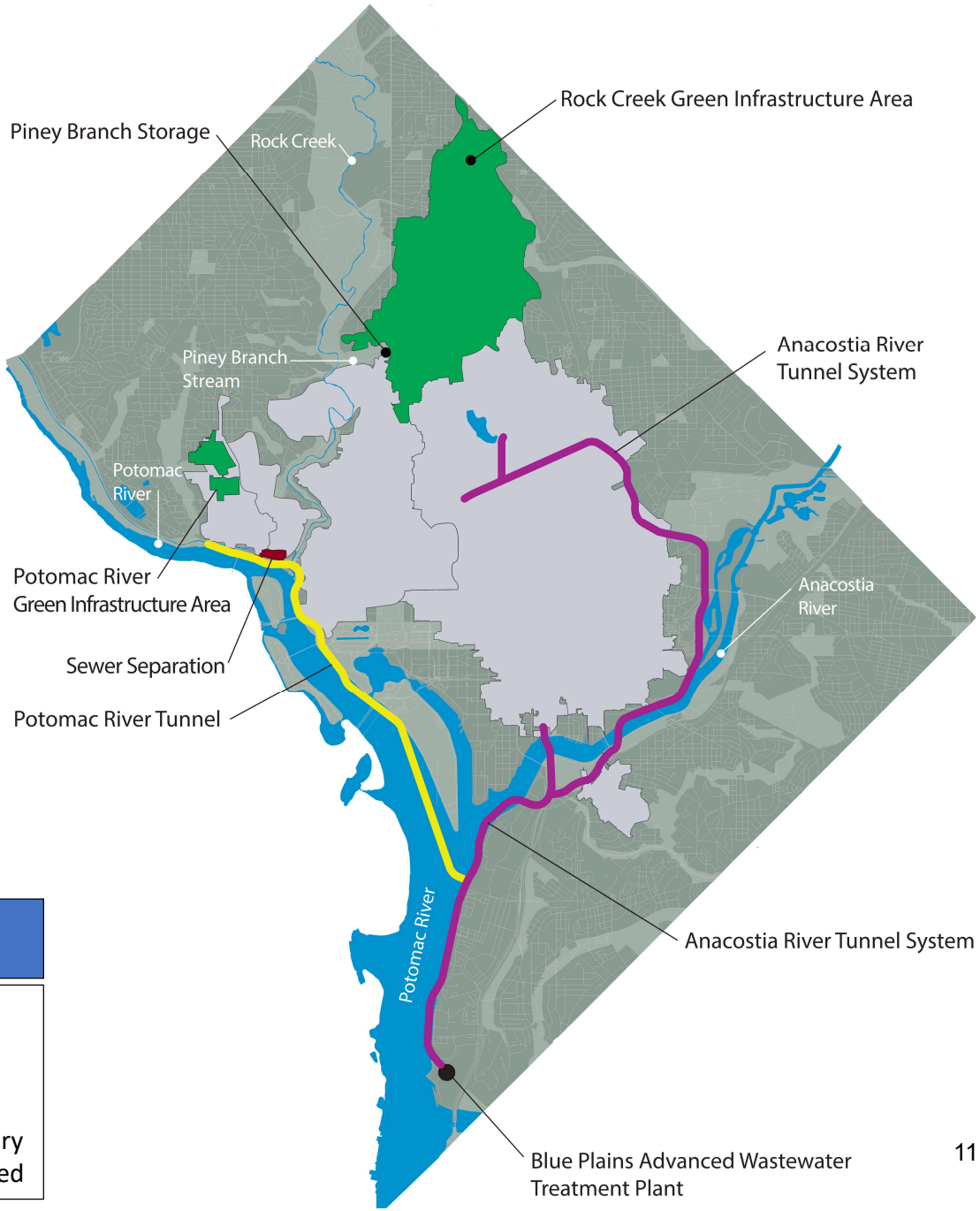
DC Clean Rivers Project Overview

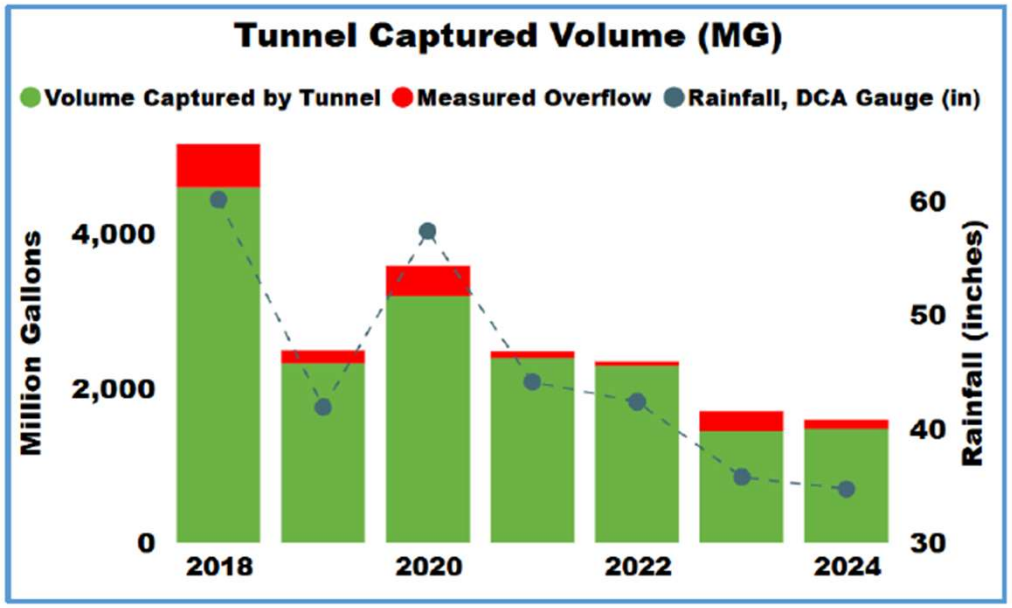




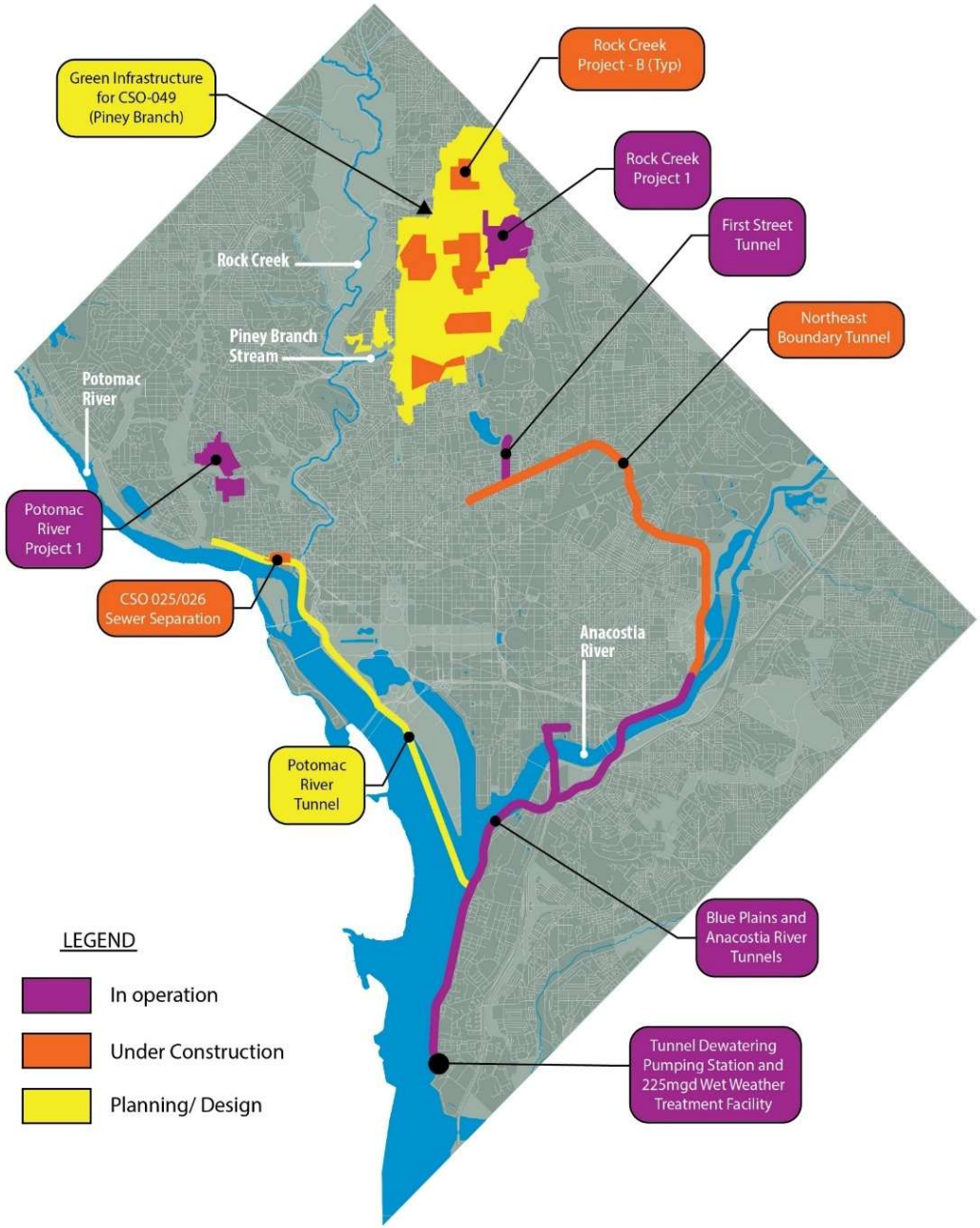
DC CLEAN RIVERS PROJECT AND NITROGEN REMOVAL PROGRAMS

- DC Clean Rivers Project: $2.99 Billion
- Nitrogen Removal: $950 Million
- Total > $ 3.4 Billion
- 25 yr implementation (2005 – 2030)
- 96% reduction in CSOs & flood relief in Northeast Boundary
- Approximately 1 million lbs/yr nitrogen reduction predicted

Clean Rivers Project Status

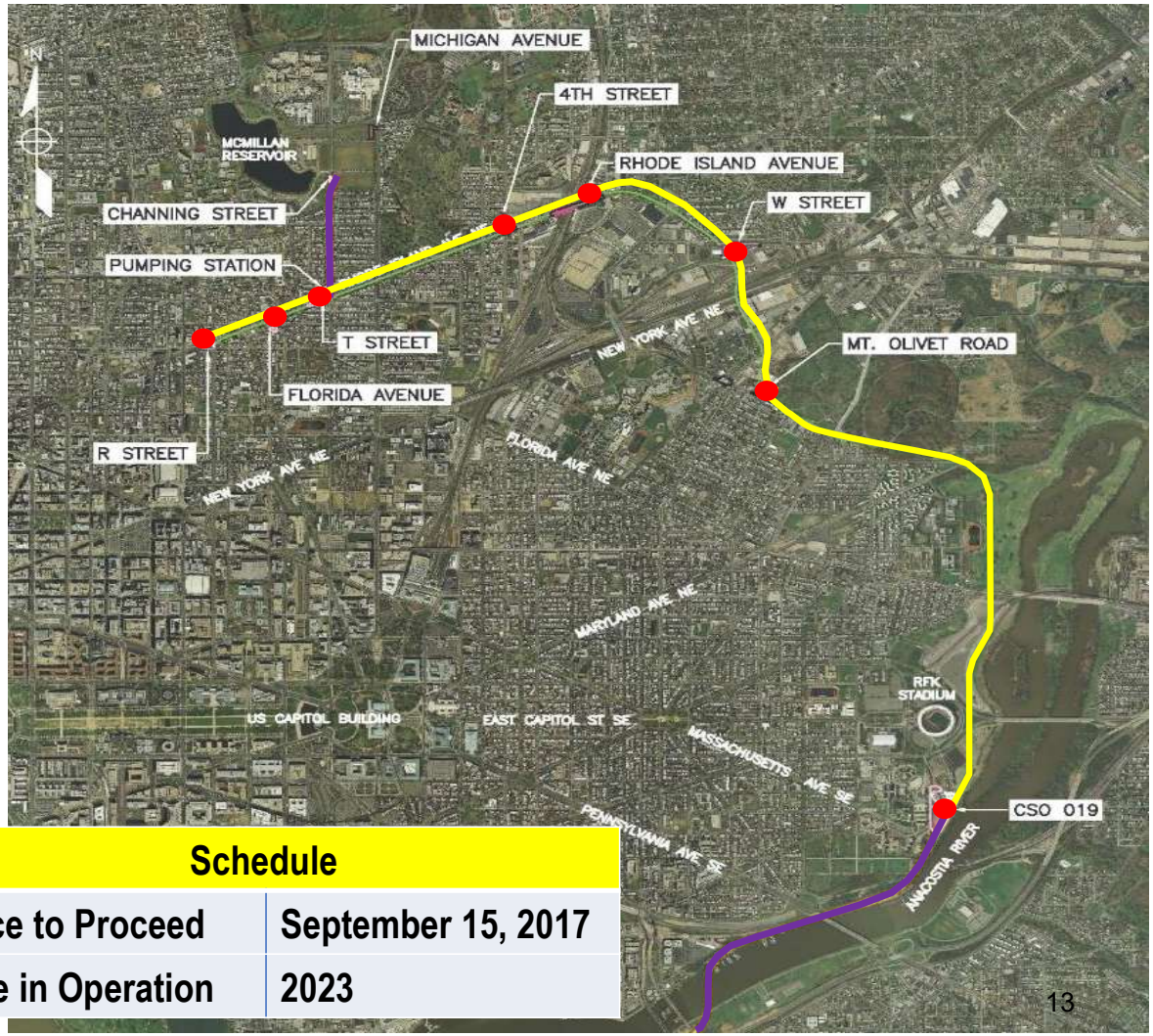


- Over 17.7 billion gallons captured March 2018 – FY 24
- Over 11,000 tons of trash, debris, and other solids captured
- Tunnel capture rate since commissioning ~ 92%



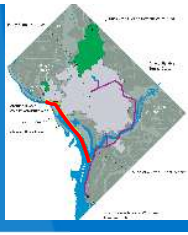
Projects in Construction Spotlight: Northeast Boundary Tunnel (Under Construction)

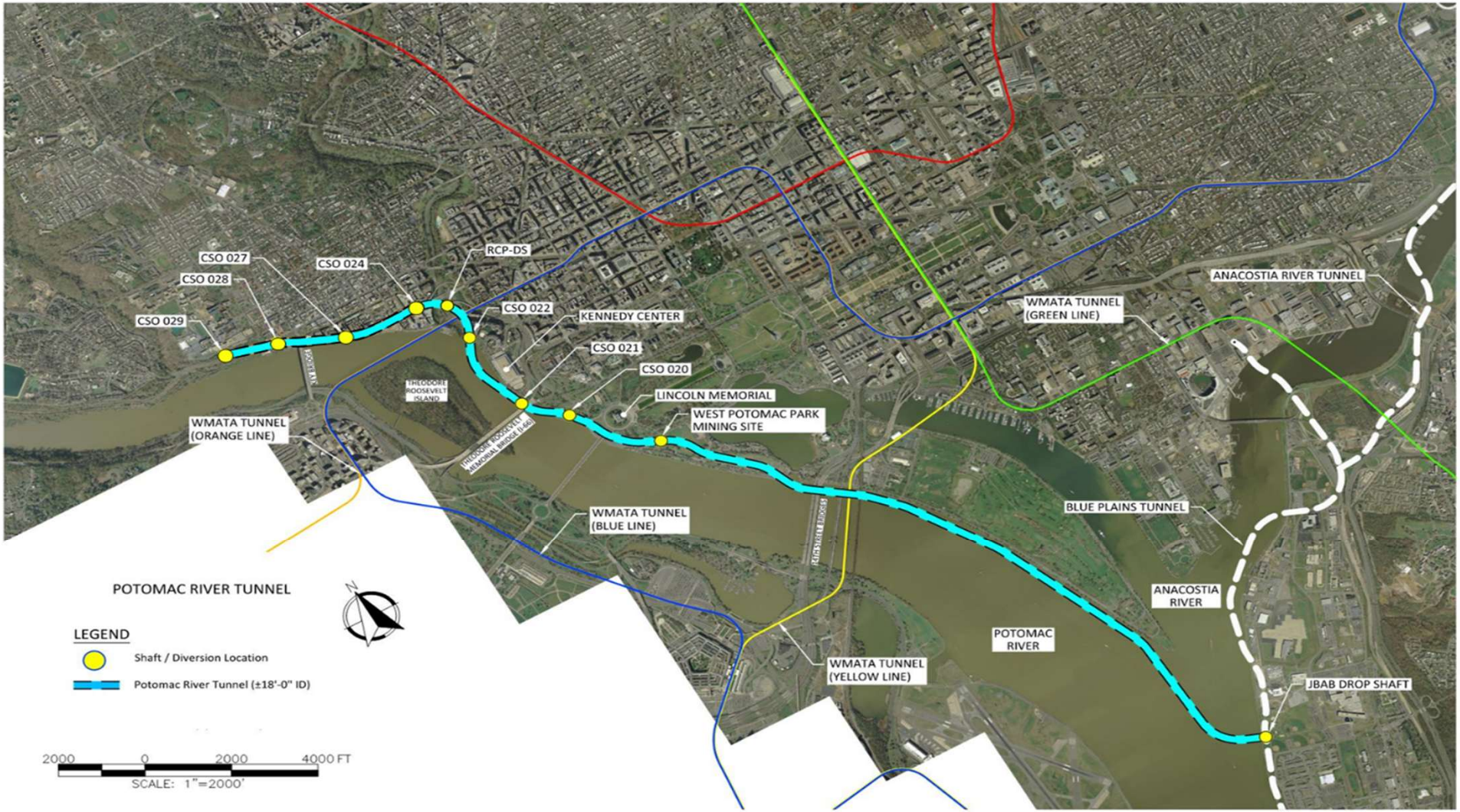
- 23-foot diameter tunnel
- 60 to 140 feet deep
- 27,000 feet long
- 7 shafts
- 5 diversion chambers
- Construction value: $580M



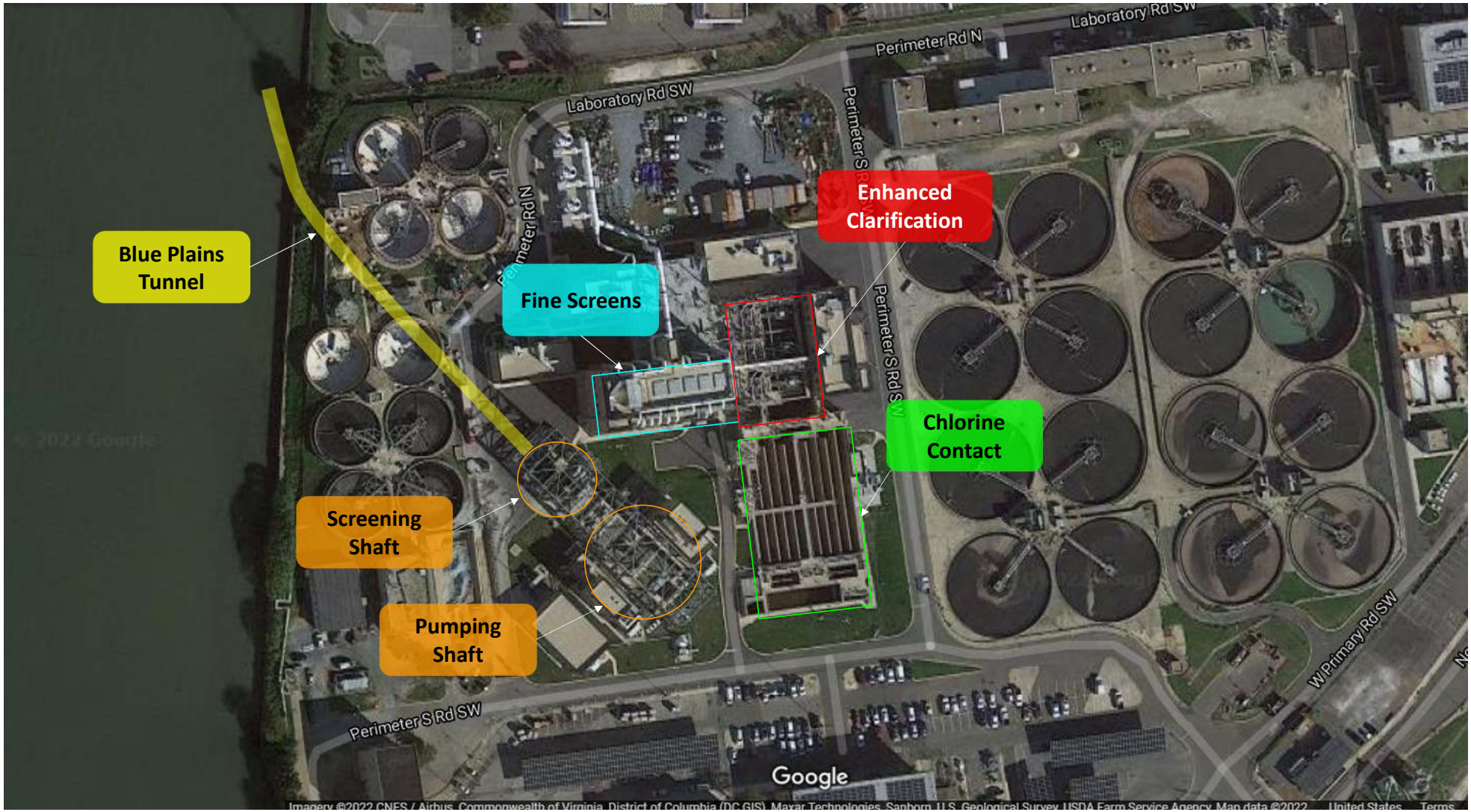
Schedule	
Notice to Proceed	September 15, 2017
Place in Operation	2023

Potomac River Tunnel

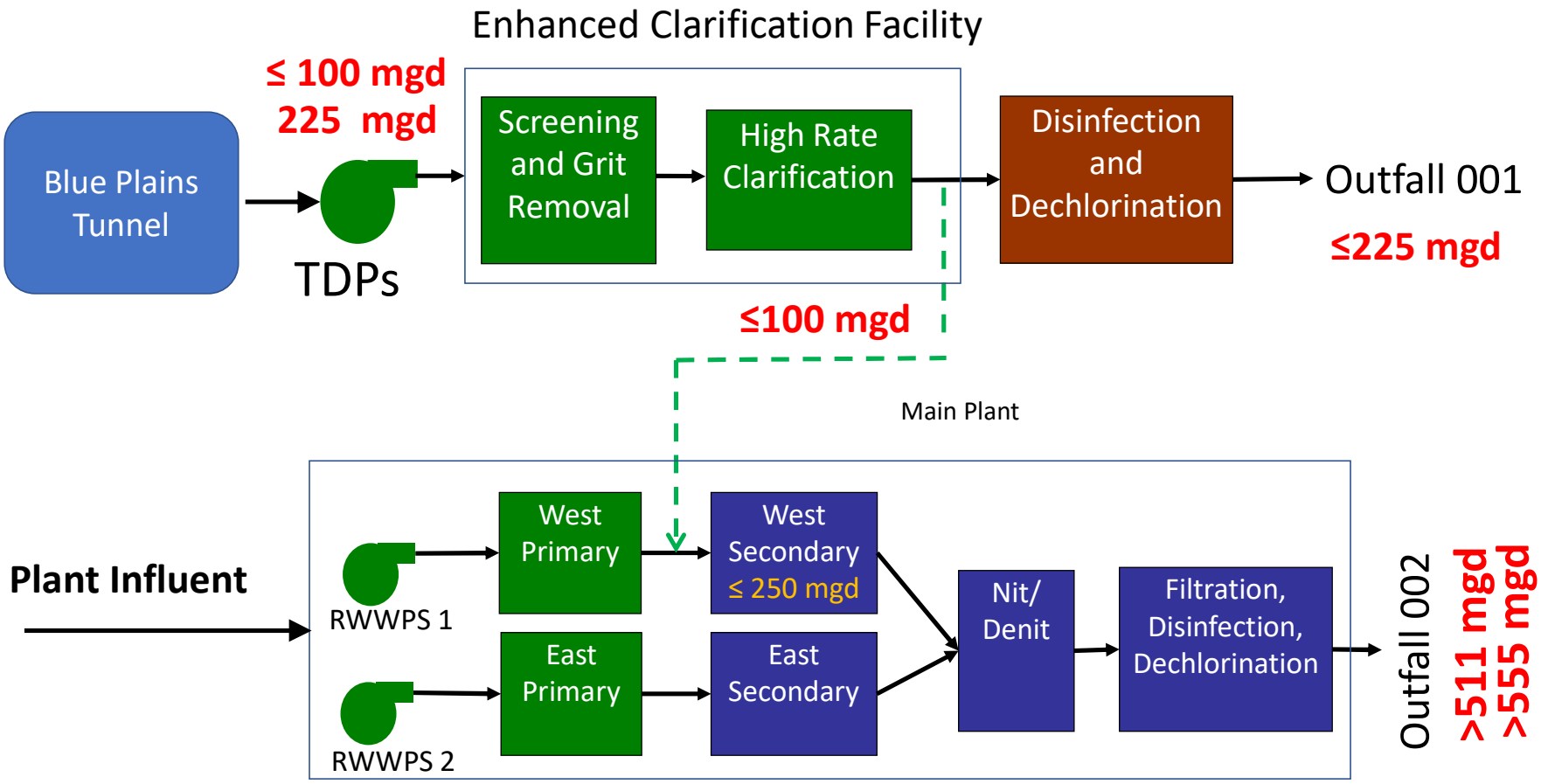




Wet Weather Treatment Facility



TDPS and ECF Flow Schematic



Questions?


POLICE


Nannie
salini
salini
impregilo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Division A
Blue Plains Tunnel 24,200 LINEAR FEET!
Lady Bird

Questions?