

# Dublin Road Water Plant

## Treatment Capacity Increase Project



**Expanding Capacity and Treatment  
at an 80 MGD Surface Water  
Treatment Plant**

**CH2MHILL**

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THE CITY OF  
**COLUMBUS**  
MICHAEL B. COLEMAN, MAYOR

# Presentation Topics

- System Overview
- Project Background
- Process Selection and Pilot Testing
- Project Phasing and Construction Contracts
- Current Project Status





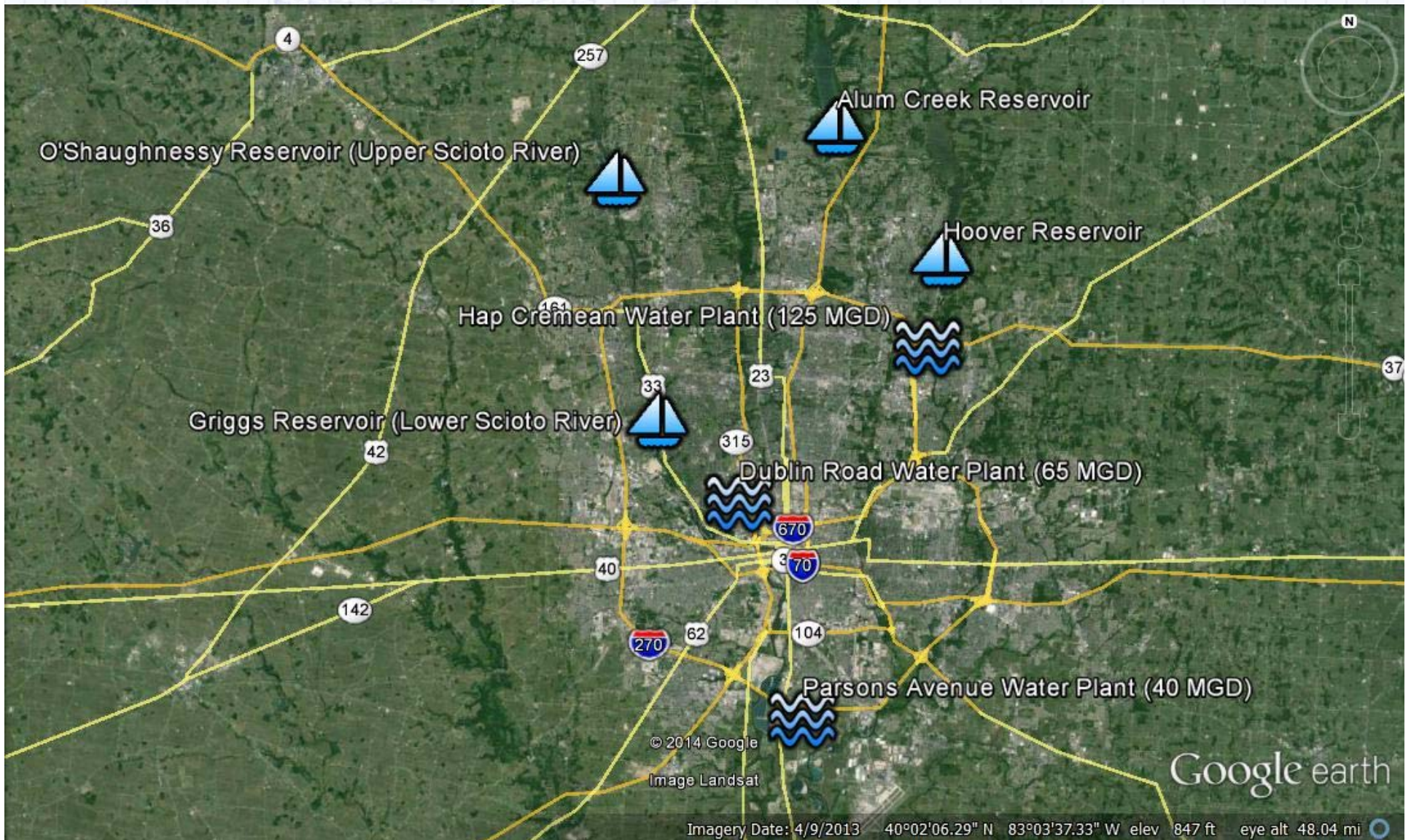
**SYSTEM OVERVIEW**



January 28, 2010



# City of Columbus, Ohio Water System







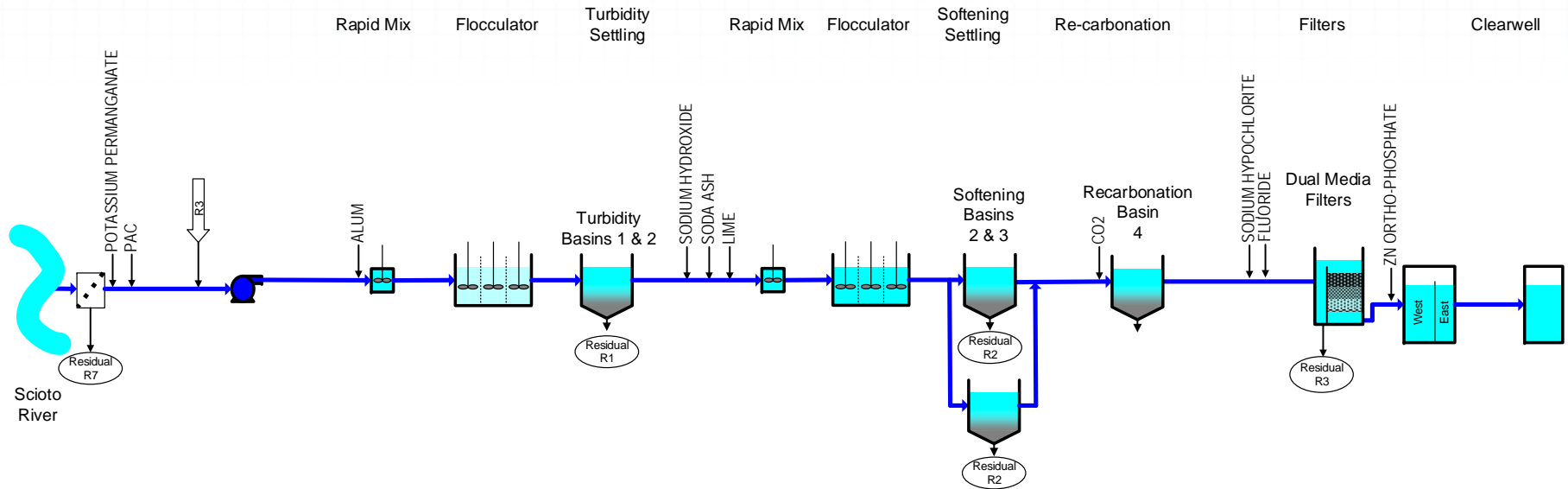
**PROJECT BACKGROUND**



**January 28, 2010**

# Existing Treatment Plant

- Conventional Lime Softening Plant
- 65 MGD Capacity



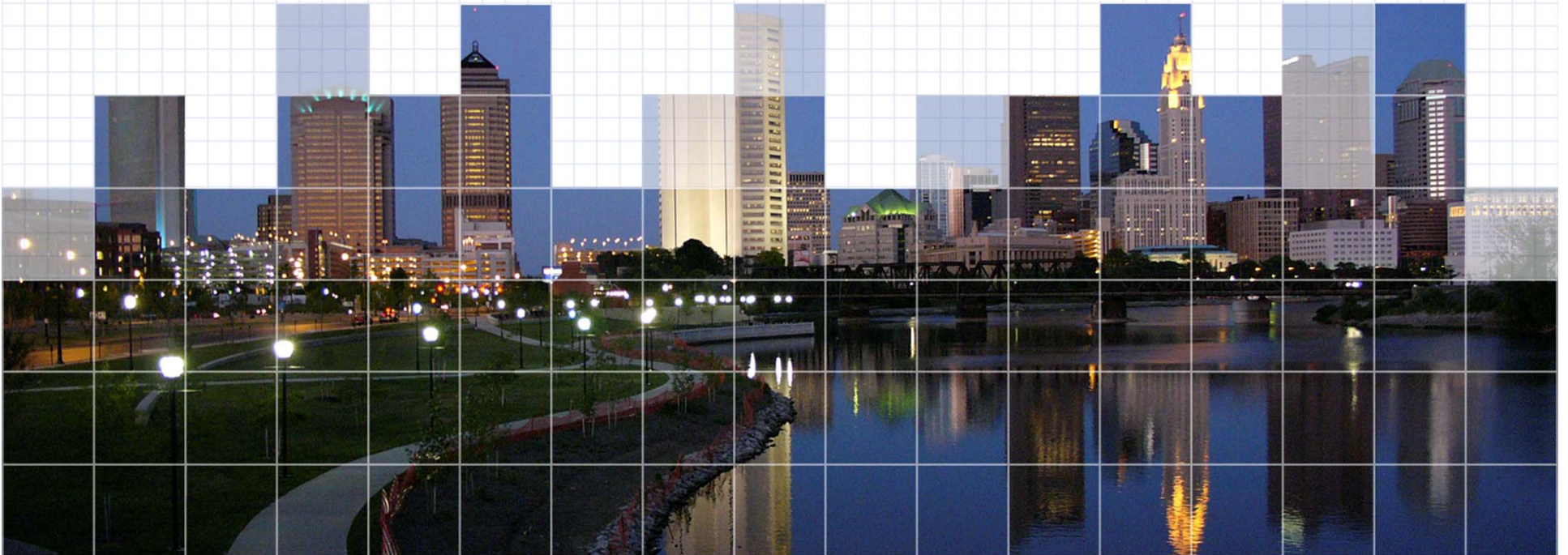
# Plant Treatment Goals

- Total Hardness: 120 mg/L to 125 mg/L as CaCO<sub>3</sub>
- Alkalinity: >35 mg/L as CaCO<sub>3</sub>
- Total Organic Carbon (TOC): <2.0 mg/L
- Stage 2 DBP Compliance:
  - Target 80% of Location Running Annual Average (LRAA) and Operational Evaluation Level
- Nitrate: < 10 mg/L as N (MCL)
- Atrazine: <2.5 ppb (MCL= 3.0 ppb)
- Comply with all primary drinking water regulations
- Taste and Odor



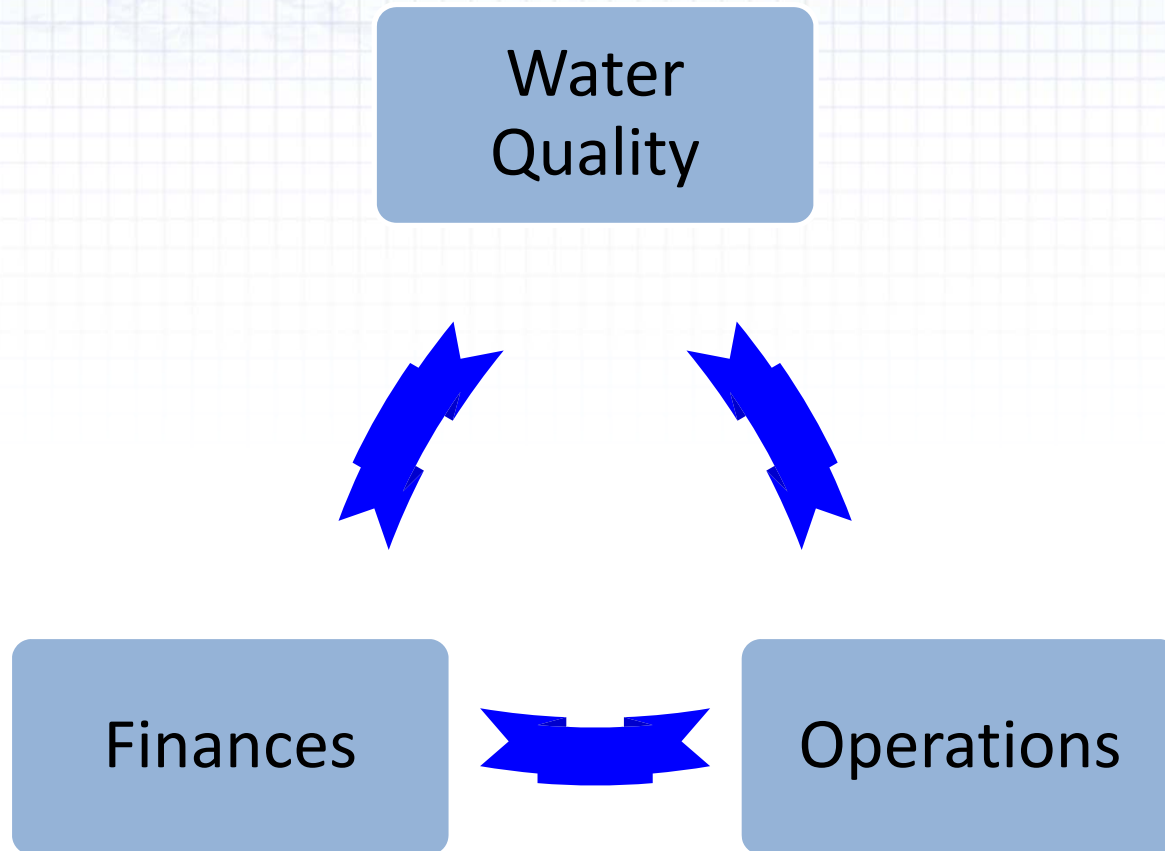


# PROCESS SELECTION AND PILOT TESTING





# “Blue Ribbon” Panel Process Evaluation



# Treatment Processes Selected for Pilot

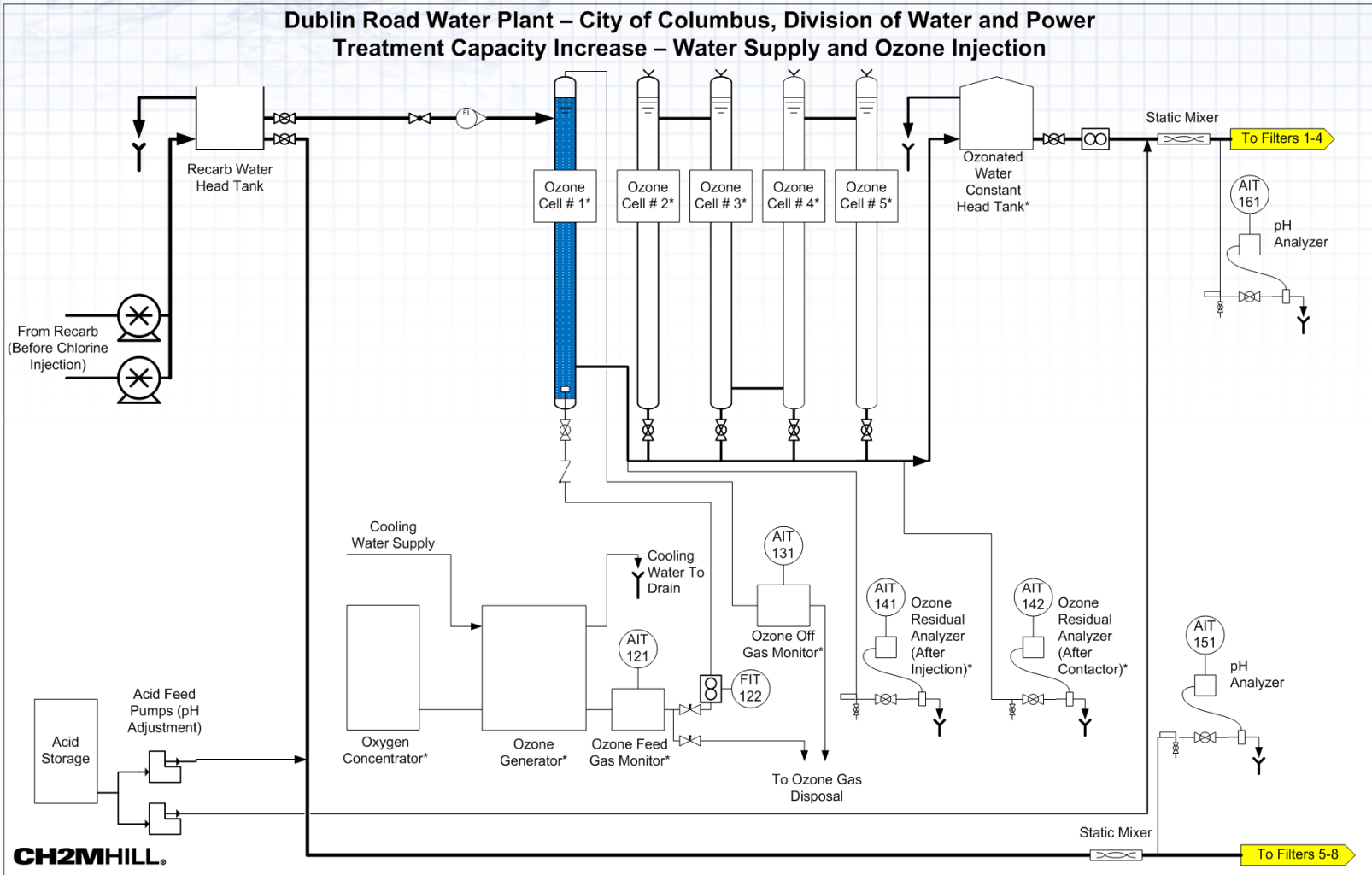
- Organics Removal
  - Ozone with Biological Active Carbon (BAC) Filtration
  - GAC Post Filter Contactors
  - GAC in Existing Filters
- Seasonal Nitrate Removal
  - Nitrate Selective Strong Base Anion Exchange





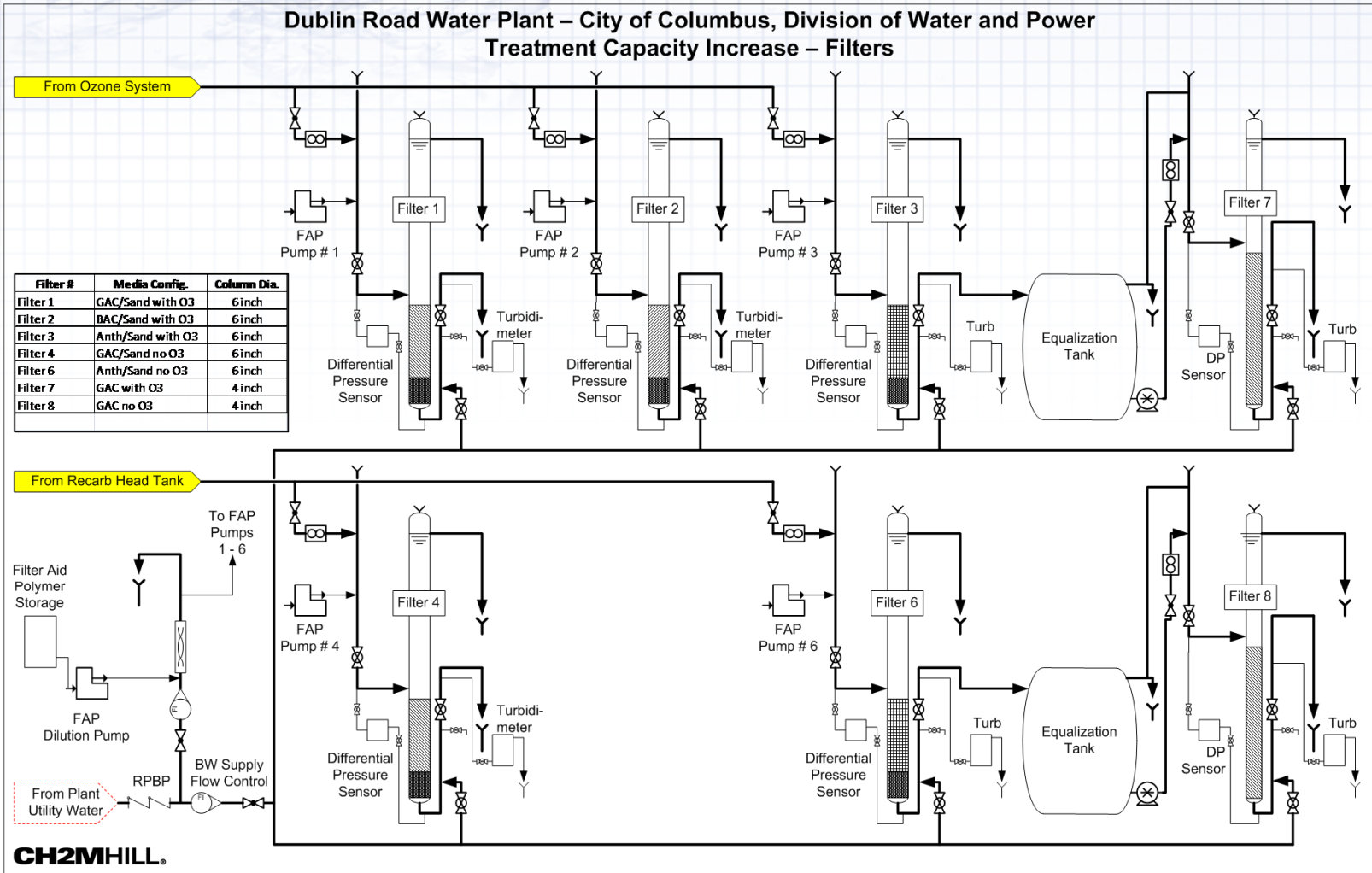
# Pilot Testing

# DRWP Ozone Pilot System





# DRWP Filter Pilot System



# DRWP Pilot Filter System

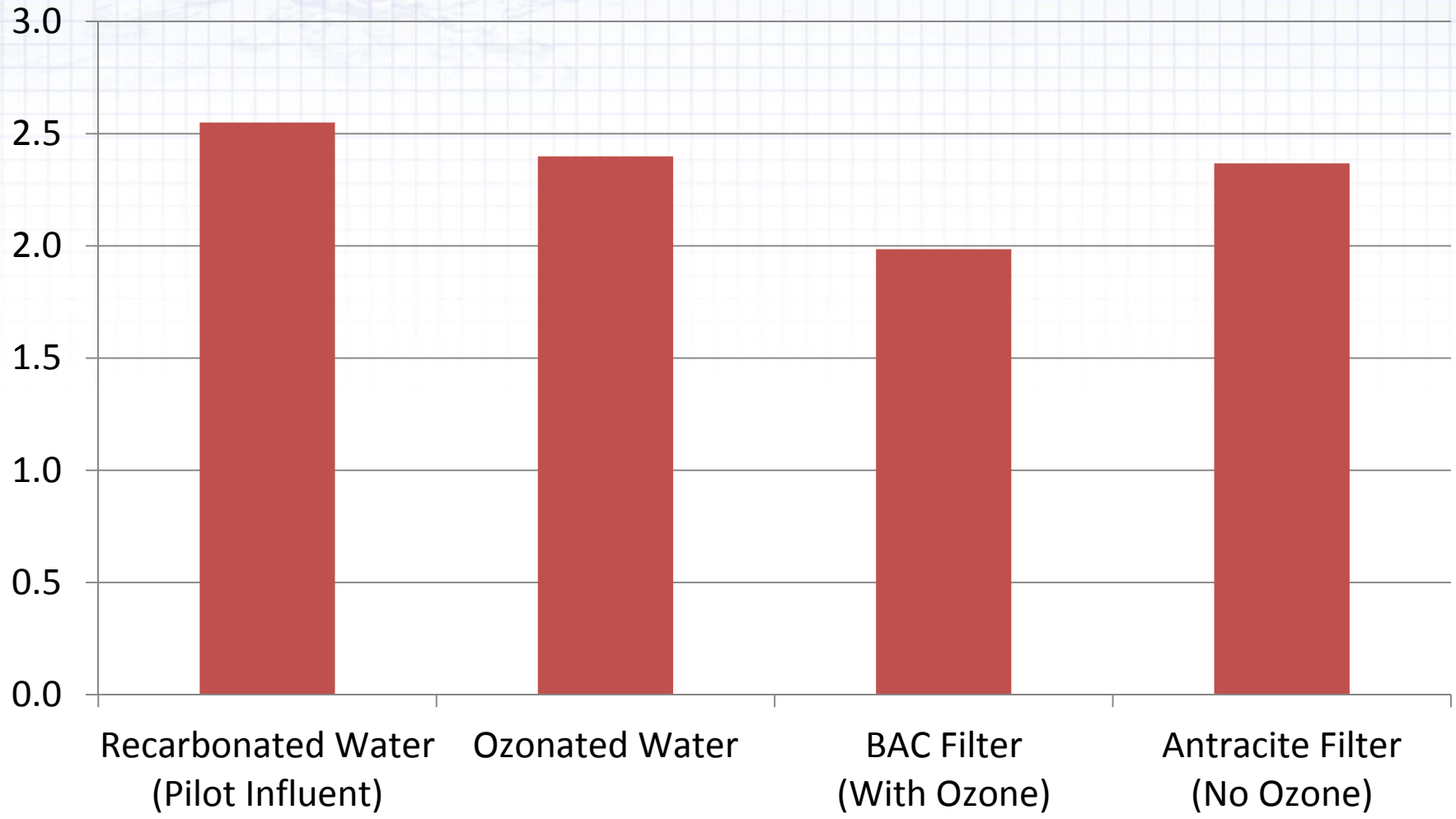




# DRWP Pilot Ozone and GAC Contactor Systems



# DRWP Pilot TOC Reduction





# DRWP Pilot System 3 Day TTHMs

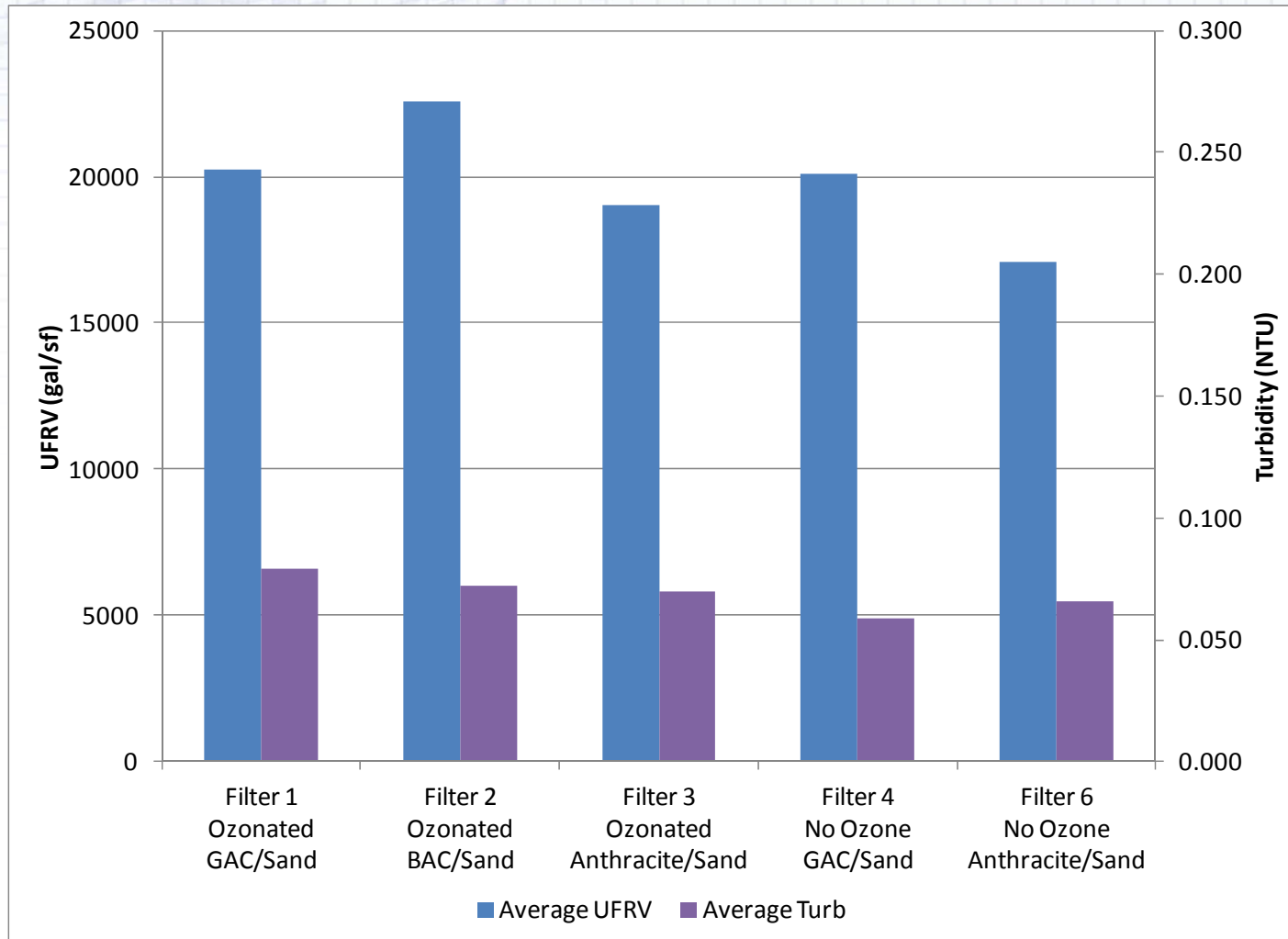


**Notes:**

**\*First DBP samples was collected late June 2011, no early June sample was available. Only Filters 4 and 6 were operational in June 2011.**

**\*\*No filter 2 DBP data available for June 2011, June 2011 Sample result predicted based on other sample results in order to calculated average.**

# DRWP Pilot Filter Performance



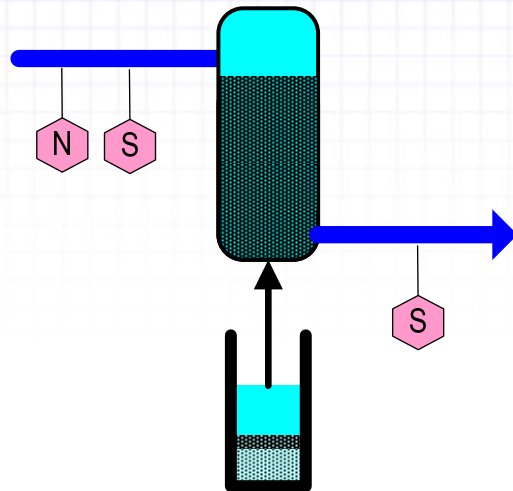


# DRWP Pilot Atrazine Removal

Sample	Influent Atrazine(ug/L)	Effluent Atrazine (ug/L)	Percent Removal
Low Ozone without Peroxide	22	15	32%
Low Ozone with Peroxide	22	12	45%
High Ozone without Peroxide	21	7.7	63%
	22	6.9	68%
High Ozone with Peroxide	22	0.4	98%

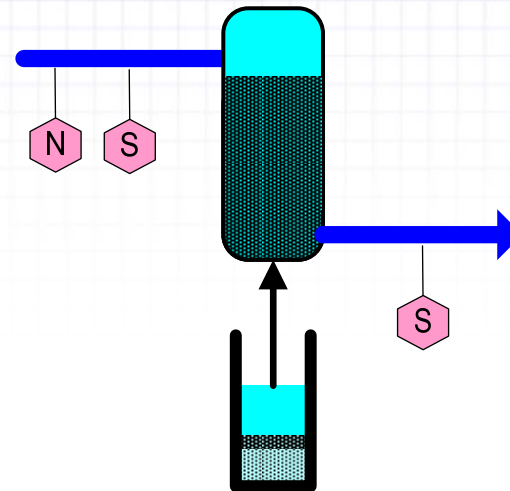
# Anion Exchange Pilot System Schematic

IX1 - ION EXCHANGE PILOT WITH  
NITRATE SELECTIVE RESIN



BRINE TANK FOR  
REGENERATION

IX2 - ION EXCHANGE PILOT WITH  
NITRATE SELECTIVE RESIN



CHEMICAL TANK FOR REGENERATION  
CAUSTIC SODA AND SODIUM BICARBONATE

 = NITRATE INJECTION POINT

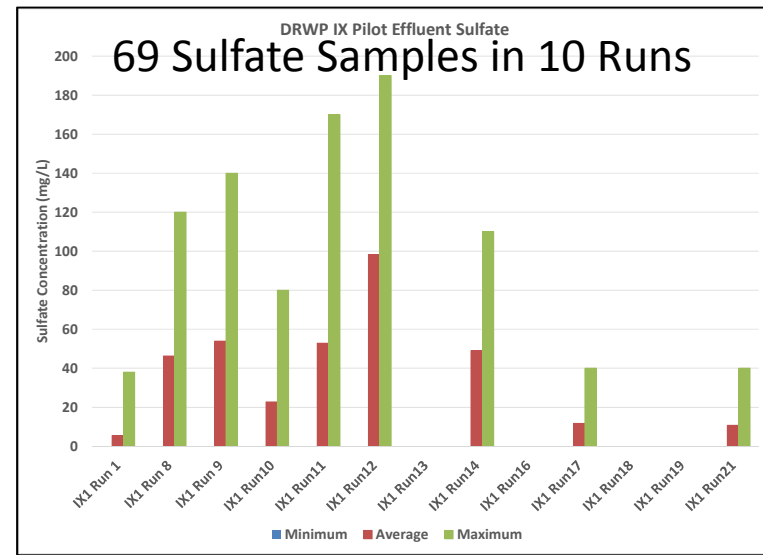
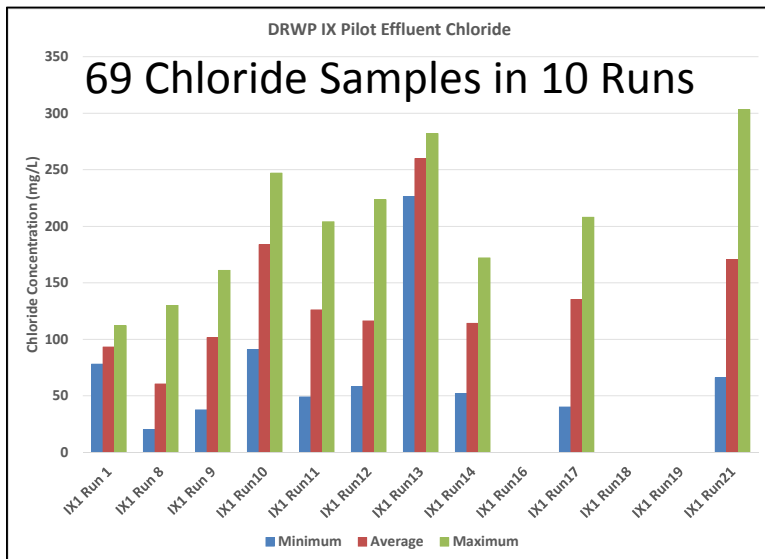
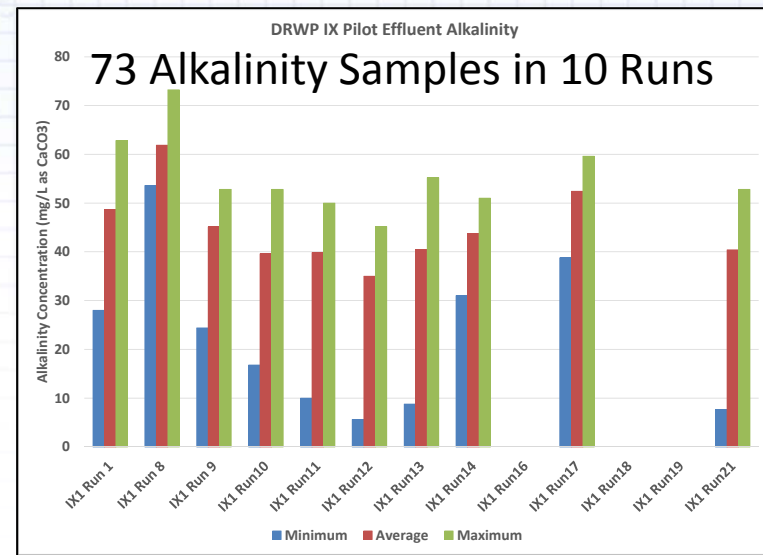
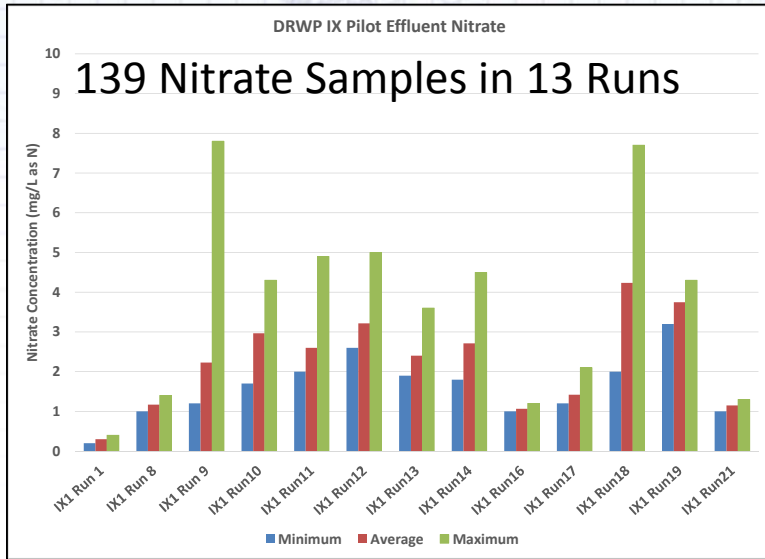
 = SAMPLE POINT



# Anion Exchange Pilot System



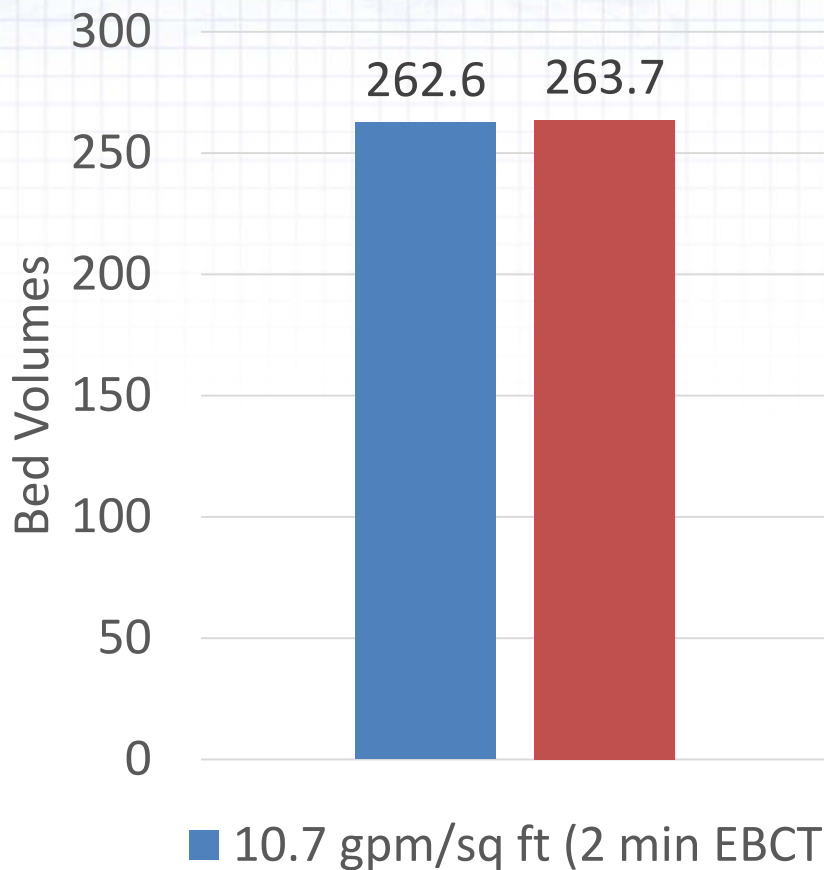
# Anion Exchange Pilot Testing Data



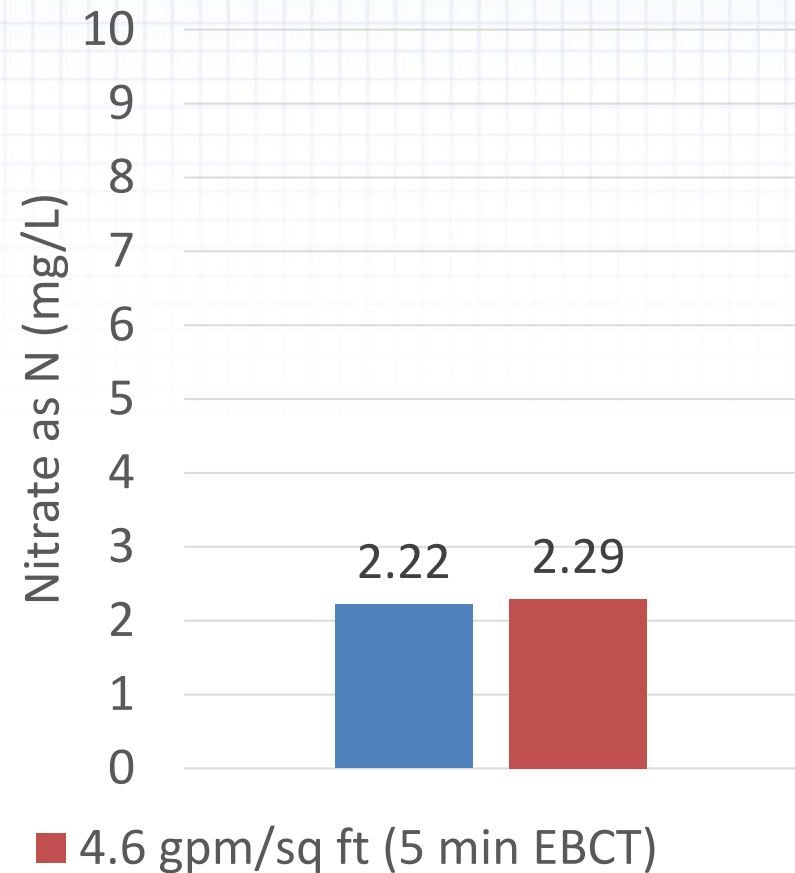


# Evaluation of IX Loading Rate Impacts

Bed Volumes to start of Nitrate Breakthrough



Average Effluent Nitrate



Data Includes 7 runs with 4.6 gpm/sq ft and 6 runs with 10.7 gpm/sq ft. These runs incorporated 93 and 46 samples, respectively.



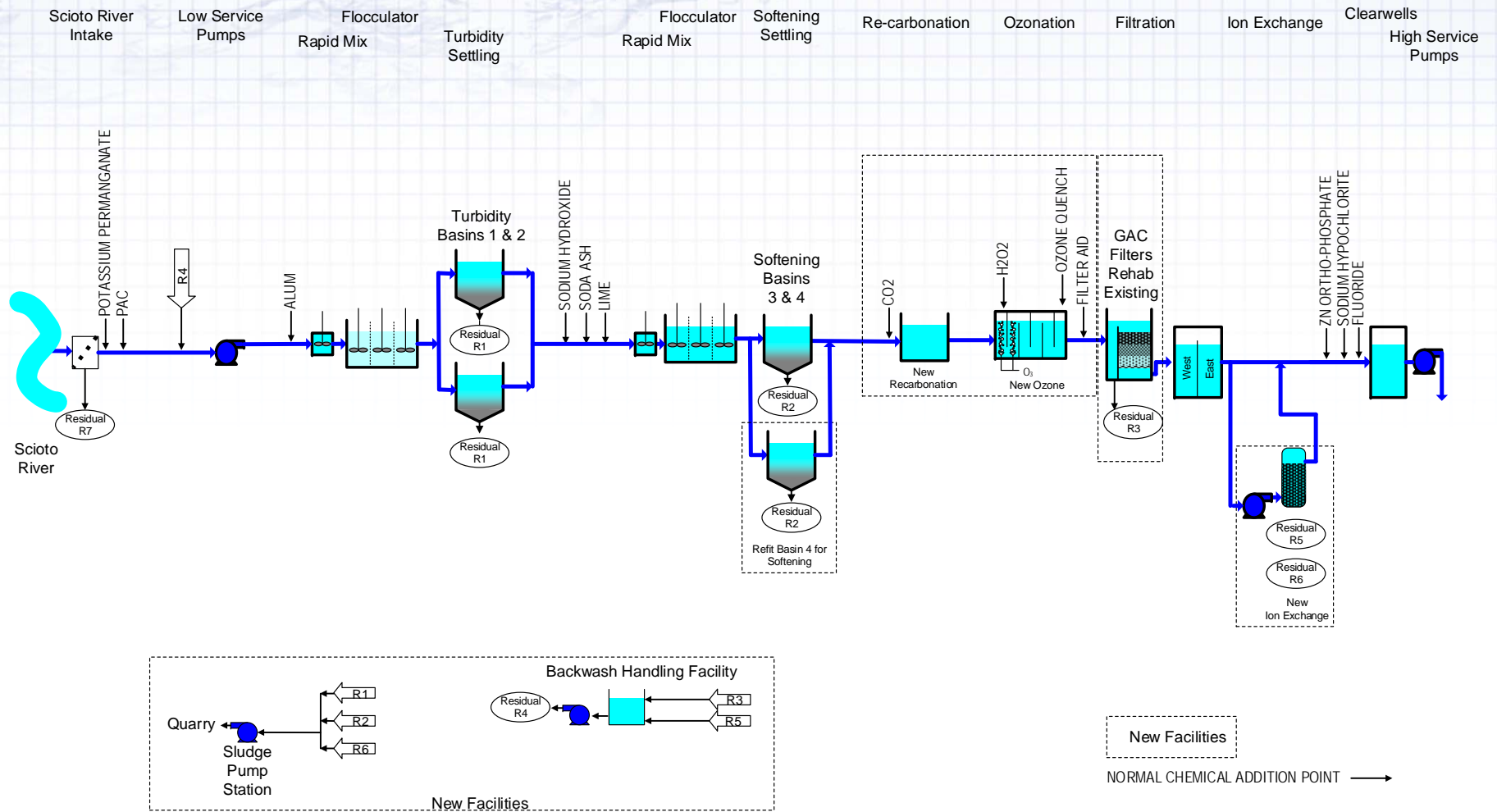
# PROJECT PHASING AND CONSTRUCTION CONTRACTS



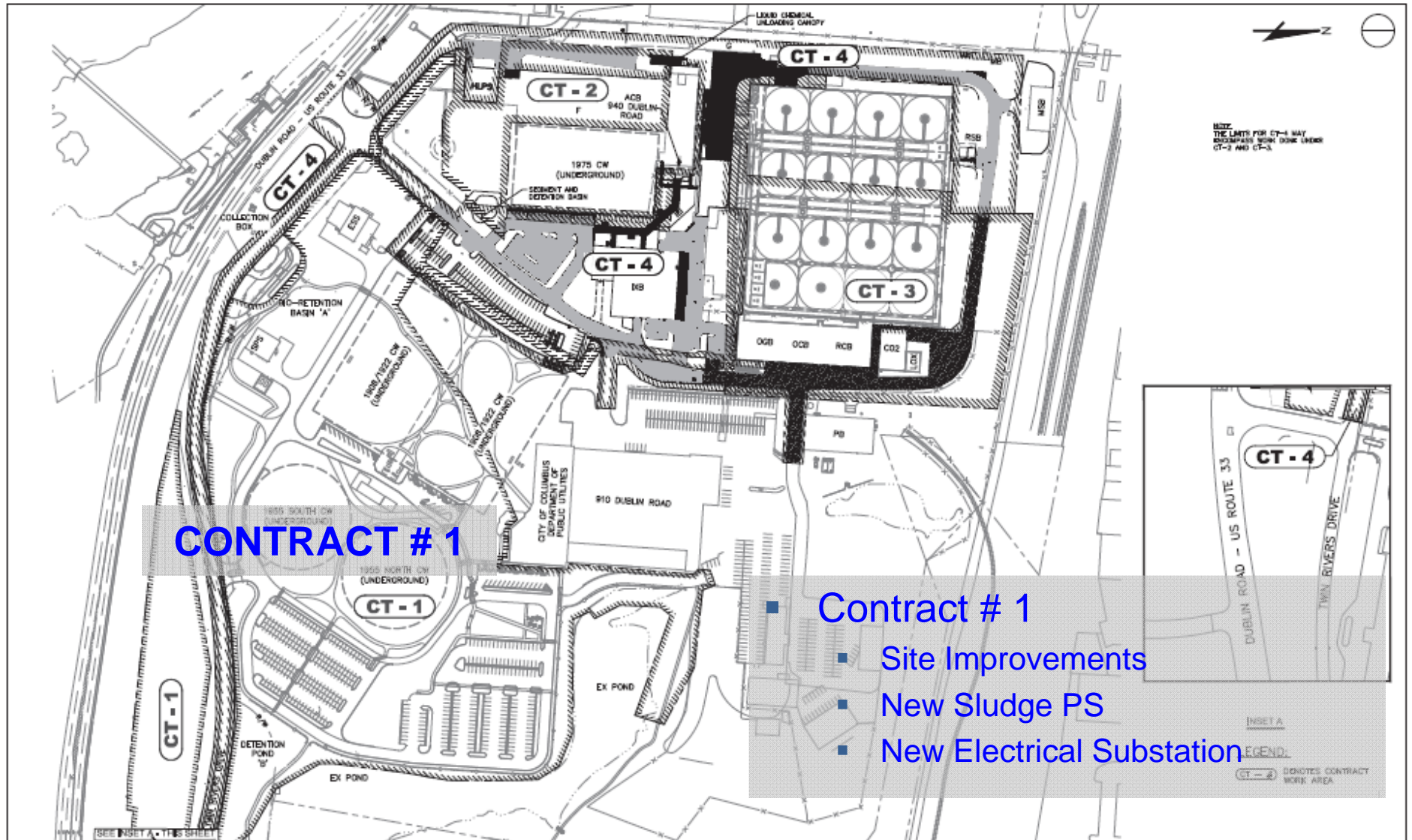
The bottom half of the slide features a panoramic view of a city skyline at night, with numerous skyscrapers illuminated and their lights reflecting on a body of water in the foreground. The image is overlaid with a white grid pattern.



# DRWP Proposed Process Flow Diagram



# DRWP Contract # 1



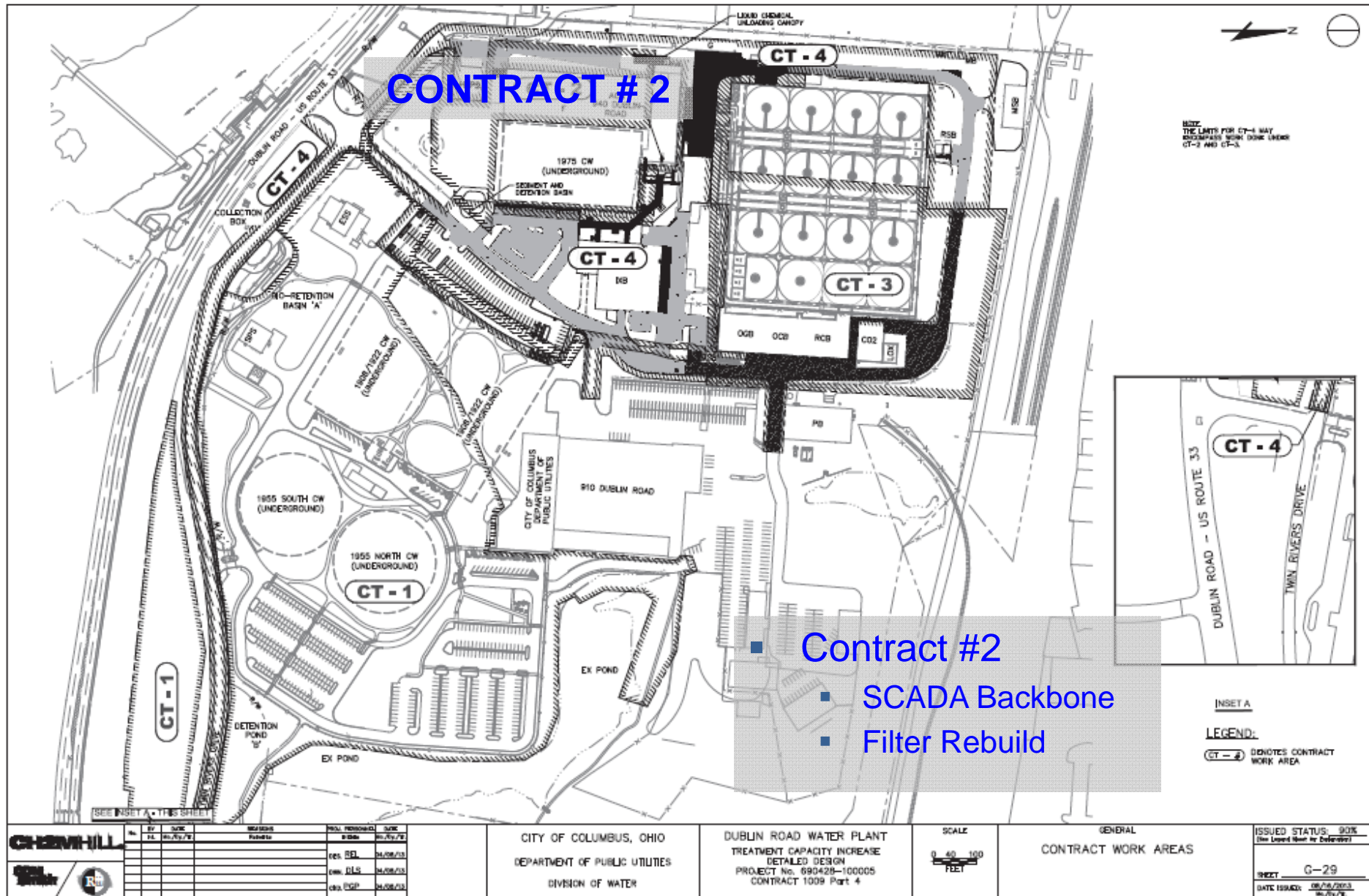
**CONTRACT # 1**

- Contract # 1
  - Site Improvements
  - New Sludge PS
  - New Electrical Substation

	BY	DATE	REVISION	PREP. PERSONNEL	DATE	CITY OF COLUMBUS, OHIO DEPARTMENT OF PUBLIC UTILITIES DIVISION OF WATER	DUBLIN ROAD WATER PLANT TREATMENT CAPACITY INCREASE DETAILED DESIGN PROJECT No. 690429-10005 CONTRACT 1009 Part 4	SCALE 	GENERAL CONTRACT WORK AREAS	ISSUED STATUS: 90% (See Legend Sheet for Explanation)
	PL	06/29/12	Revised	08/08/13	08/08/13					
				des. BGL	08/08/13					PROJECT G-29
				con. DLR	08/08/13					DATE ISSUED: 08/26/2013
				chd. PGP	08/08/13					08/27/13

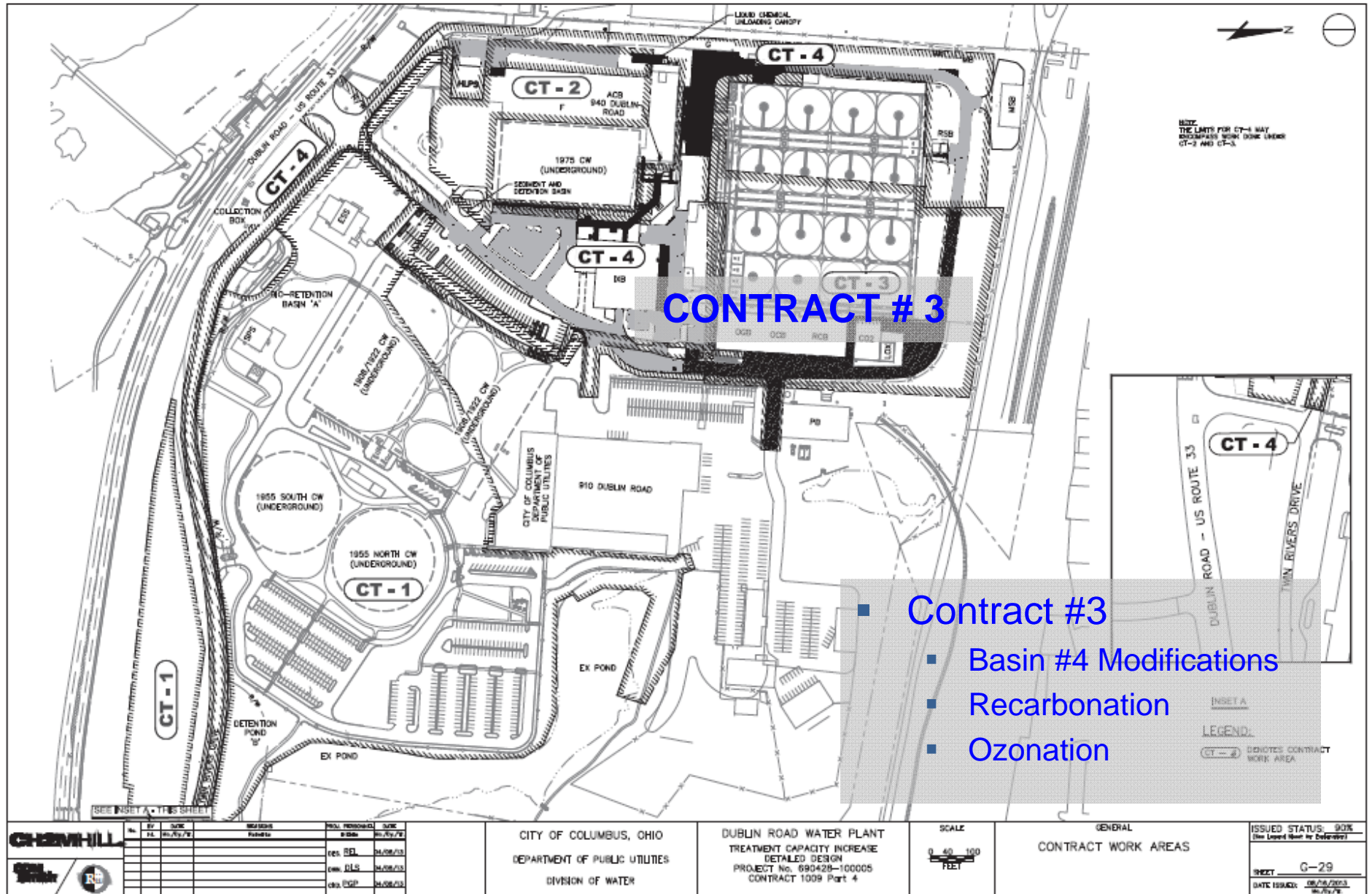


# DRWP Contract # 2



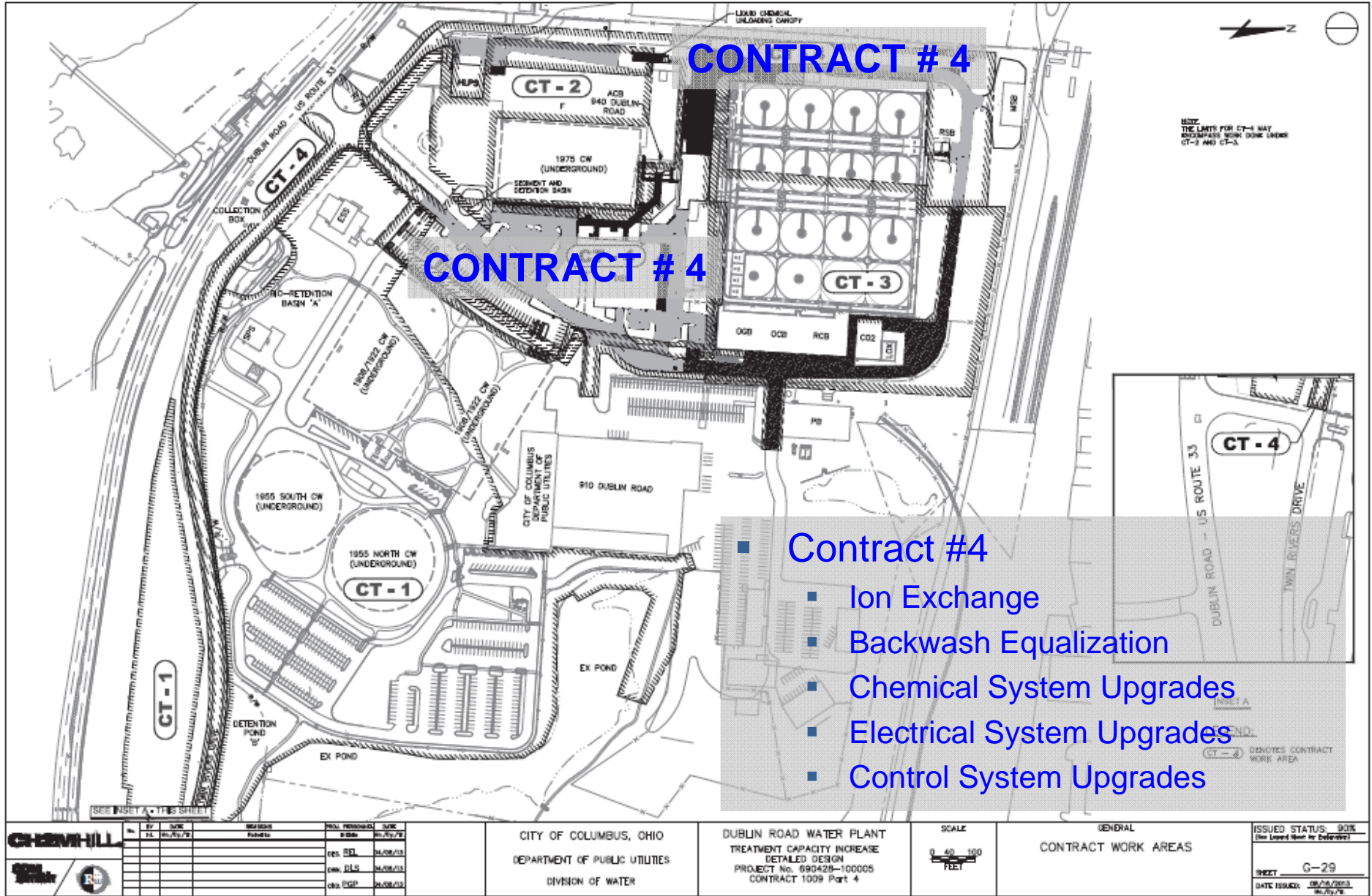


# DRWP Contract # 3





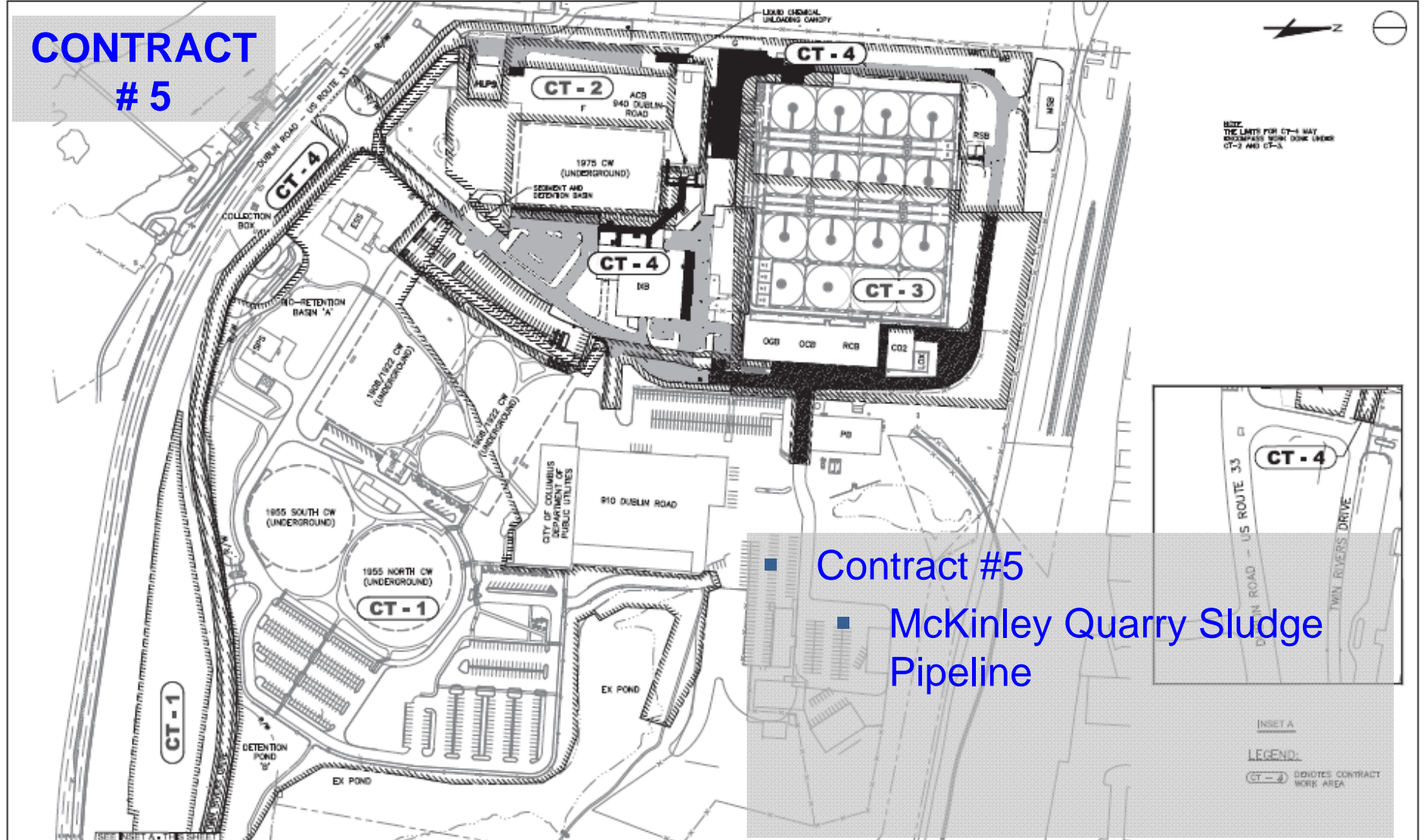
# DRWP Contract # 4





# DRWP Contract # 5

**CONTRACT # 5**



- Contract #5
- McKinley Quarry Sludge Pipeline

NOTE:  
THE LIMITS FOR CT-4 MAY  
ENCOMPASS WORK DONE UNDER  
CT-2 AND CT-3.

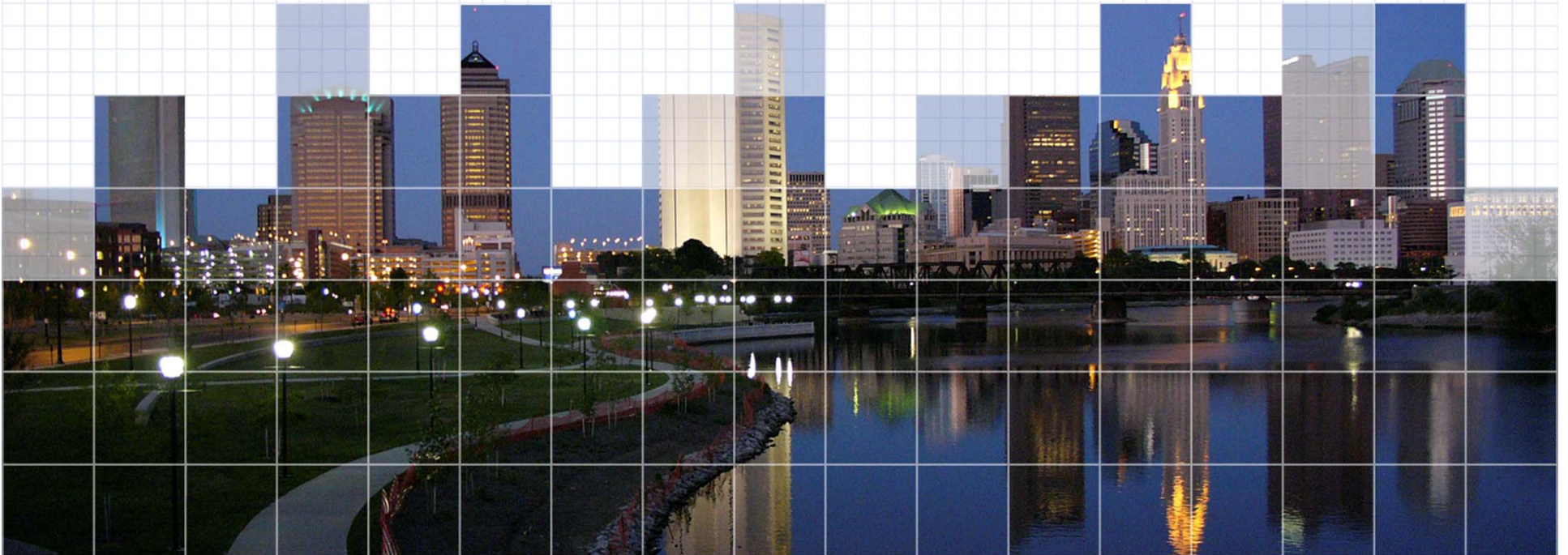
INSET A  
LEGEND:  
CT-4 DENOTES CONTRACT  
WORK AREA

	BY	DATE	REVISION	PREP. PERSONNEL	DATE	CITY OF COLUMBUS, OHIO DEPARTMENT OF PUBLIC UTILITIES DIVISION OF WATER	DUBLIN ROAD WATER PLANT TREATMENT CAPACITY INCREASE DETAILED DESIGN PROJECT No. 890428-10005 CONTRACT 1008 Part 4	SCALE 	GENERAL CONTRACT WORK AREAS	ISSUED STATUS: 90%
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				chd. PGP	08/08/13					08/27/12





# CURRENT PROJECT STATUS





# Contract 1 – Site Improvements





# Contract 1 – Sludge PS

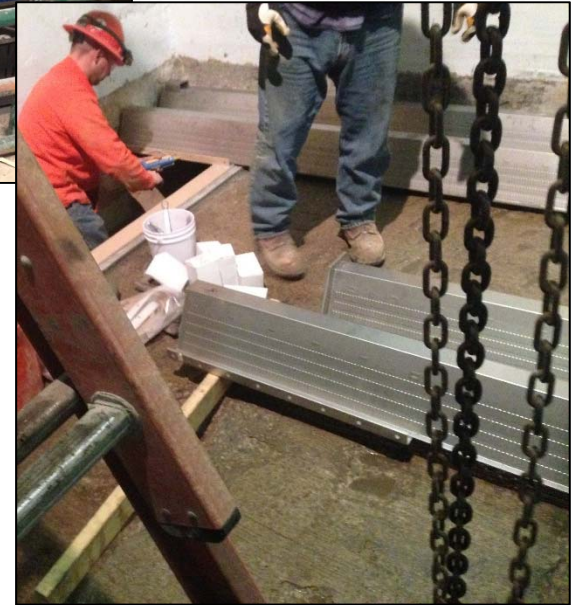




# Contract 1- Electrical Substation



# Contract 2 – Filter Retrofit





# Contract 3 – Ozone/Recarbonation Basin





# Dublin Road Water Plant

## Treatment Capacity Increase Project

Questions?

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