Getting the Biggest Bang for Your Buck

$200 million Treatment Plant Upgrade and Expansion

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Presentation Topics

- Project Background
- Project Scope & Budget
- Condition Assessment
- Repurposing
- Construction Phasing
- Current Project Status

PROJECT BACKGROUND

Existing Treatment Plant--Site

- Original Plant -- 1907
- Existing Plant Constructed --mid 1970's
- No option to obtain additional site
  - Railroad
  - Post Office
  - Major Road plus Scioto River
  - County Engineers Office and Abandoned Landfill
- Department of Public Utilities Office Complex—1980's

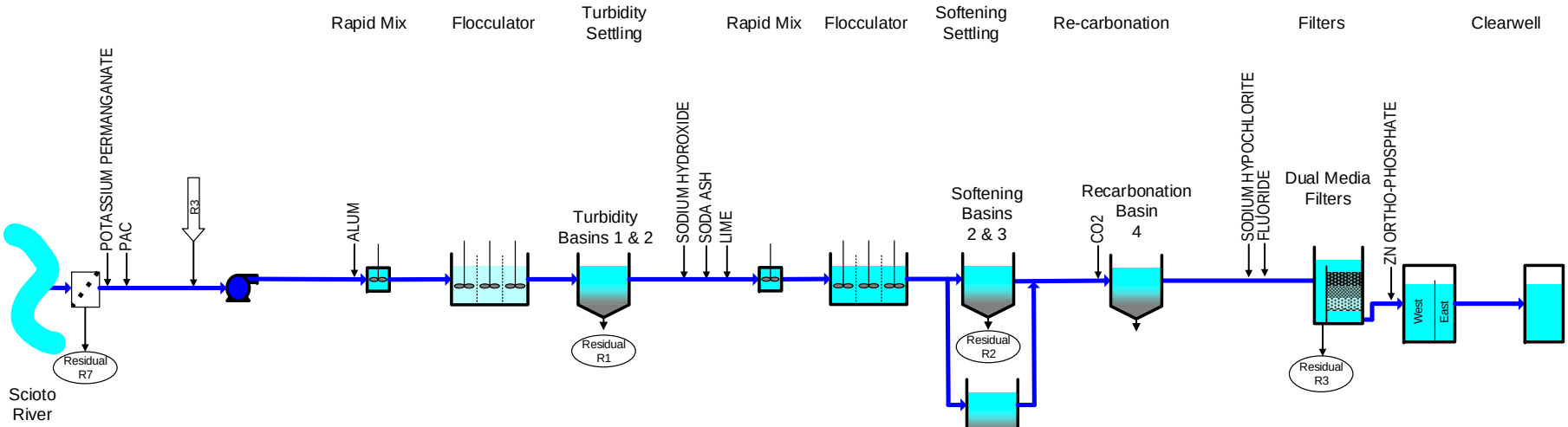
Existing Site Plan
City of Columbus, Dublin Road Water Plant

Existing Treatment Plant--Site

- Multi Purpose Site
  - Treatment Plant
  - DPU Administrative Offices
  - Fleet Maintenance Facilities
  - Support Facilities and Personnel
- Access Required at All Times
- Public Access and Parking—Normal Business Hours
- Maintain Space for Future Treatment Requirements

Existing Treatment Plant

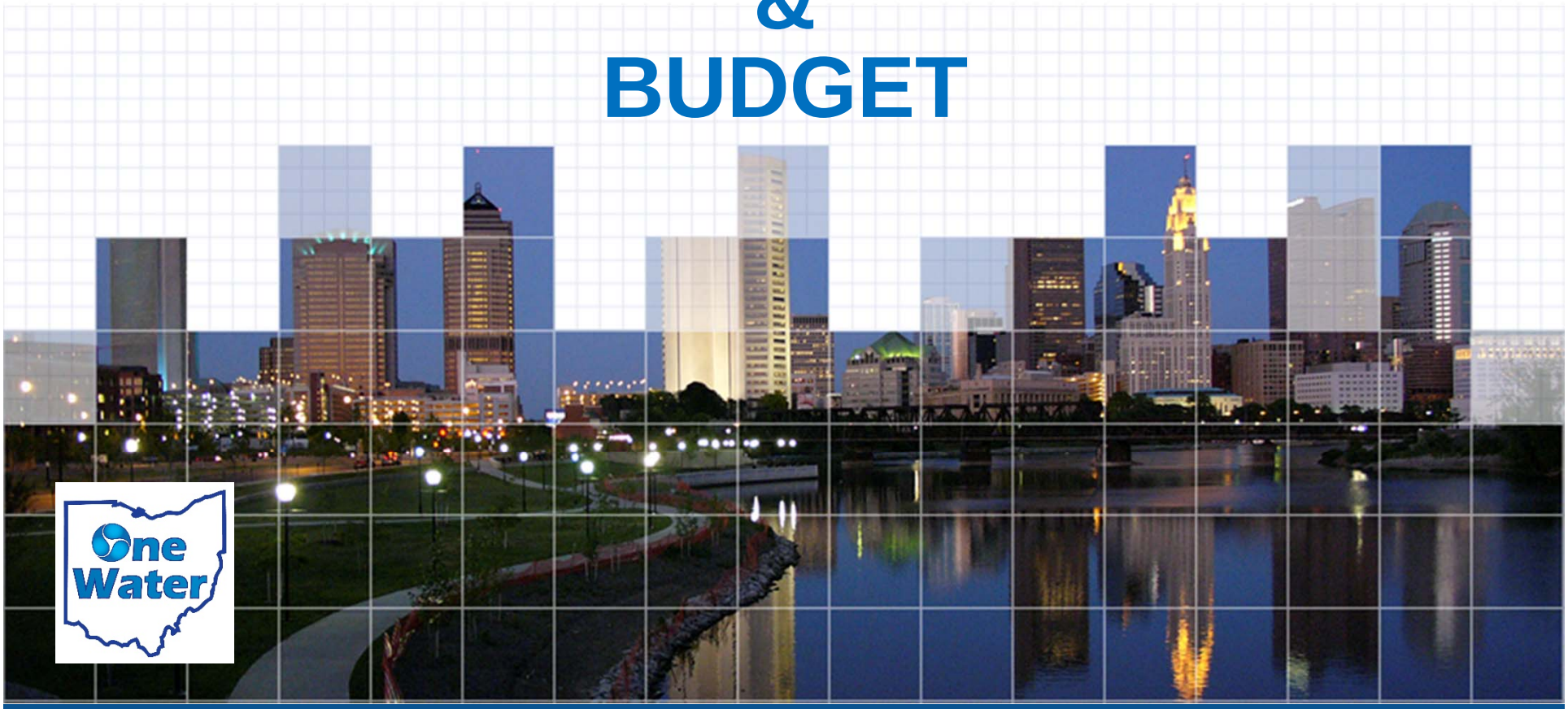
- Scioto River
- Conventional Lime Softening Plant
- 65 MGD Capacity



Plant Treatment Goals

- Total Hardness: 120 mg/L to 125 mg/L as CaCO3
- Alkalinity: >35 mg/L as CaCO3
- Total Organic Carbon (TOC): <2.0 mg/L
- **Nitrate: < 10 mg/L as N**
- **Atrazine: <2.5 ppb (MCL= 3.0 ppb)**
- **Stage 2 DBP Compliance:**
  - Target 80% of Location Running Annual Average (LRAA) and Operational Evaluation Level
- **Comply with all primary drinking water regulations**
- Taste and Odor

PROJECT SCOPE
&
BUDGET



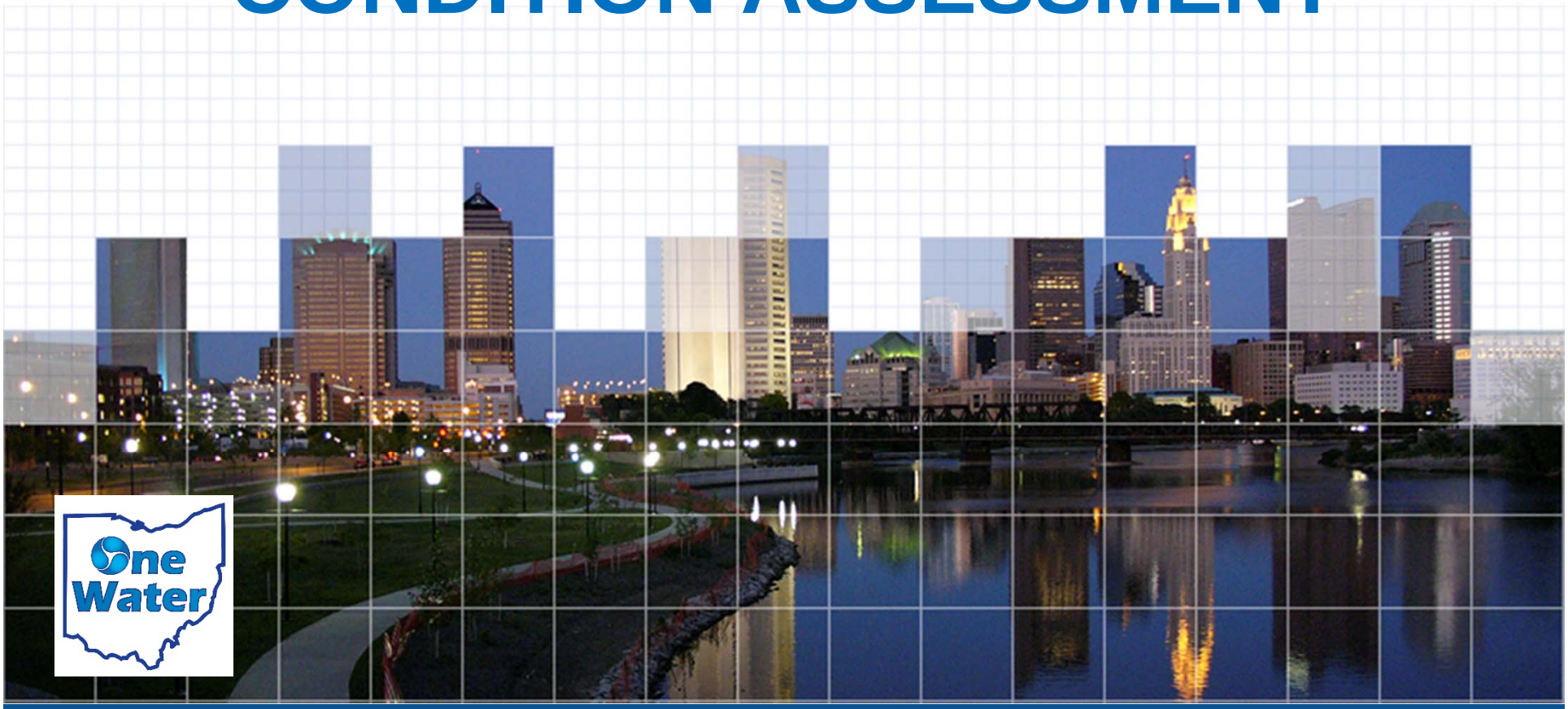
BUDGET

- Budget = $200 M
- Established in 2007/2008
- Expansion to 80 mgd
- Budget Included:
  - New Processes for Regulatory Compliance
  - Reliability Upgrades
- Other CIP Items

Approach to Achieving Goals & Budget

- Non-Negotiable Goals – Regulatory Compliance & Safety
- Everything Else on the Table
  - Size of Expansion
  - Treatment Process Selection
- Detailed Condition Assessment
- Re-purposing of Existing Facilities to Maximum Extent
- Phasing of Project

CONDITION ASSESSMENT



Condition Assessment

- All Equipment and Structures Included
- OLD Not Sufficient Reason For Replacement
- Each Item Scored Based Upon Selected Criteria
- Evaluations of O & M Records
- Long Term Availability of Spare Parts

Primary Condition Assessment Factors

- Condition of Asset - C_A
- Criticality of Asset - C_R
- Consequence of Failure of Asset - C_F
- Redundancy of Asset - R
- **Regulatory/Code Compliance of Asset - Cc**
- **Health and Safety of Asset – C_H**

$$\textbf{Score} = ((C_A * C_R * C_F)/R) + Cc + C_H$$

Table 1
Condition Assessment Ratings
Instrumentation & Control System
Dublin Road Water Plant

$$\text{Score} = [C_A \times C_R \times C_F / R] + C_C + C_H$$

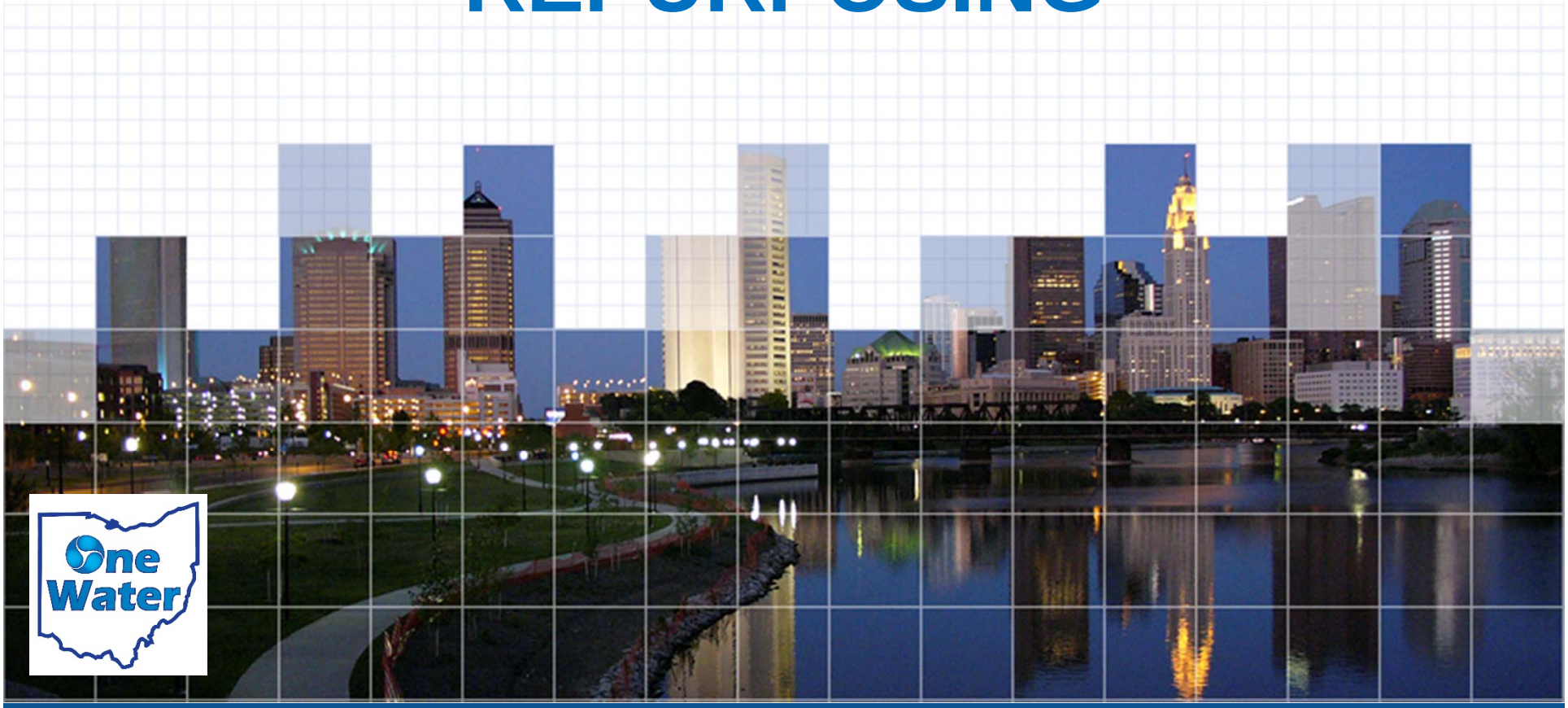
C_A – Physical Condition of the Asset	C_F – Consequence of Failure of the Asset	C_R – Criticality of the Asset
1 = Excellent 2 = Good 3 = Satisfactory 4 = Marginal 5 = Poor	1 = Minimal impact to staff or environment (low) 3 = Specific training, awareness and/or equipment required (medium) 5 - May trigger an emergency response. Response planning required (high)	1 = Minimal impact on treatment, control and/or compliance (low) 3 = Alternatives available and/or have time to address problem 5 = No or limited alternatives available & no or limited time to address problem
R – Redundancy of the Asset	**C_C – Regulatory / Code Compliance of the Asset**	**C_H – Health and Safety Compliance of the Asset**
1 = Poor component has no redundancy 2 = Moderate: Component Redundancy equals 1 (e.g. standby pump) 4 = Component redundancy is greater than 1	0 = Complies with all codes/regulations; or a waiver/variance can be granted 30 = Does not comply with current regulations (e.g. OEPA)	0 = No health/safety issues associated with the asset in its current condition 10 = Adverse health and safety issue; moderate concern 30 = Adverse health and safety issue; high concern

Asset	C_A	C_R	C_F	R	C_C	C_H	*Score*	*Bin 1*	*Bin 2*	*Bin 3*	*Notes*
SCADA Software	4	5	5	1	0	0	100	X			• Existing SCADA software cannot be reinstalled on new hardware. • Telvent moving to Windows OS. • Telvent no longer supporting with security patches.

Evaluation/Path Forward

- Equipment Placed in “Bins” based upon Score
  - Score > 30 = ‘Bin 1’
  - Score = 9-30 = ‘Bin 2’
  - Score < 9 = ‘Bin 3’
- Workshops with DOW and Plant Staff
- Preliminary Costs Developed
- Preliminary Project Definition Finalized
- Continue to Re-Assess

PROCESS EVALUATION & REPURPOSING



Major Items Not Included

- Additional Flocculation Basins
  - Primary Cold Water Concern
    - *Added Filter Aid Polymer*
    - *Added Coagulant Aid Polymer*
- Residuals Thickening
  - Added Sludge Density Meters Instead
- Backwash Treatment
  - Equalization Only
  - Historical Performance
- Chemical Feed Building/Facilities
  - *Repurpose/Upgrades*

Major Repurposing

- Existing Recarb Basin → Sedimentation Basin

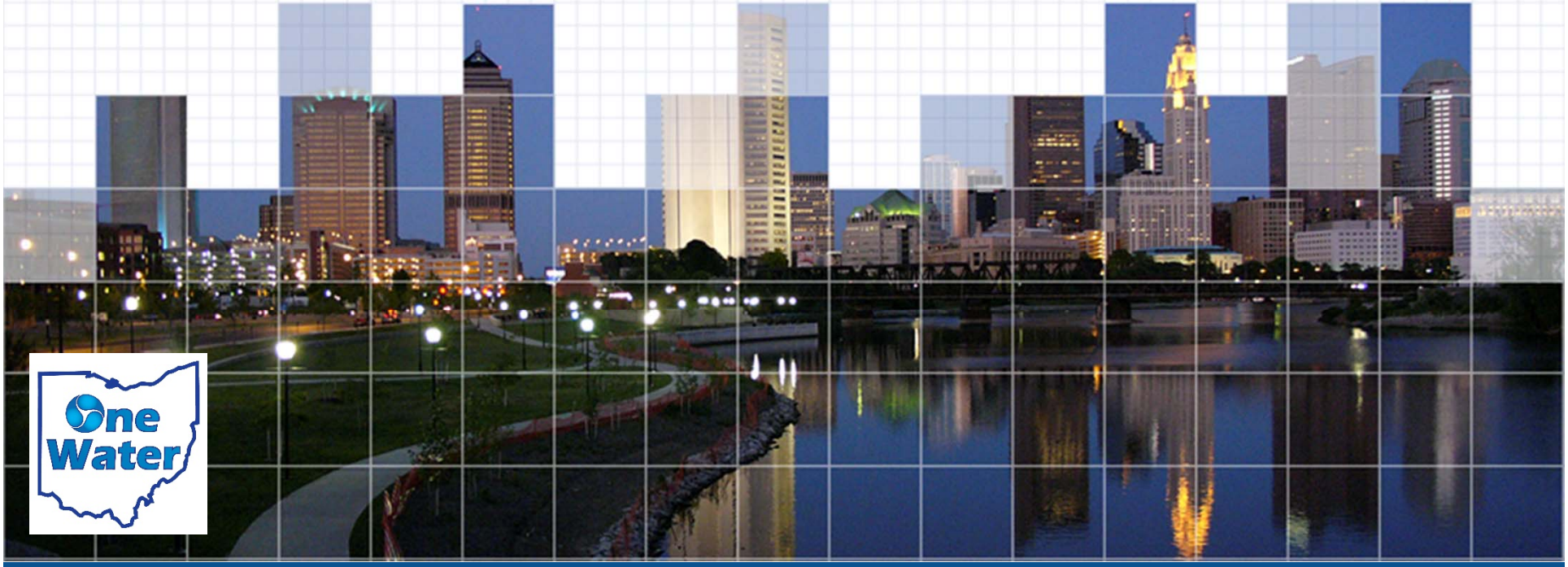
REPURPOSING

- Existing Backwash Pumps → IX Pump Station

Other Repurposing

- Portion of Existing Clearwell Used for New Mixing Chamber
  - Potential Future Use for UV
- Ex. PAC Storage Tanks Converted to Chemical Containment

PROJECT PHASING
CONSTRUCTION CONTRACTS

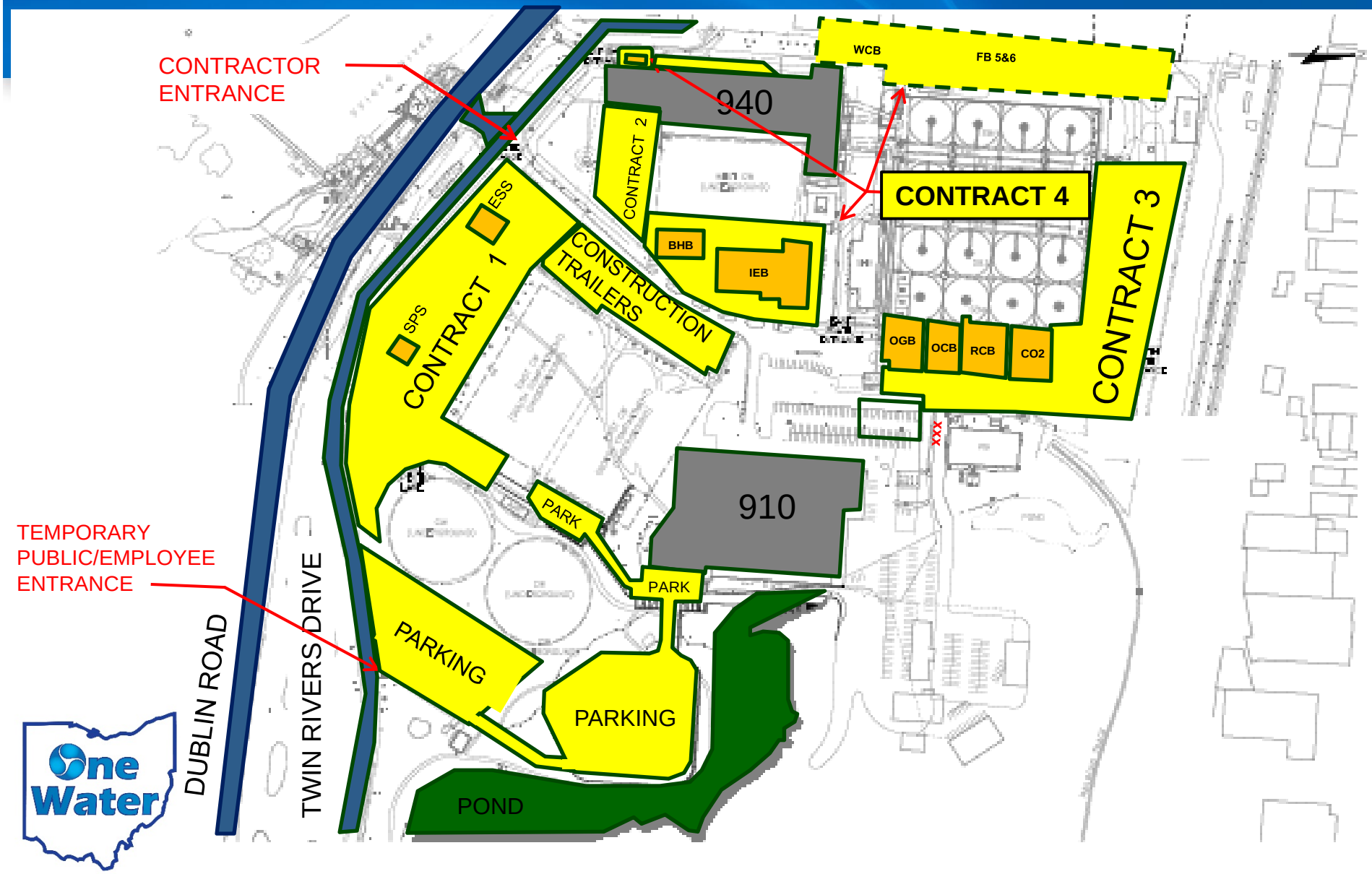


Phasing Criteria

- Prioritize Contract Sequence
  - Risk/Critical Upgrades
  - Project Size and Type of Work
  - Coordination with Construction at Other WTP
- Multiple Construction Contracts
  - Five Contracts
  - Maximize Bidders/Competition
  - Site Usage/Maintain Plant Operations

“Existing” DRWP

DRWP Construction Contracts

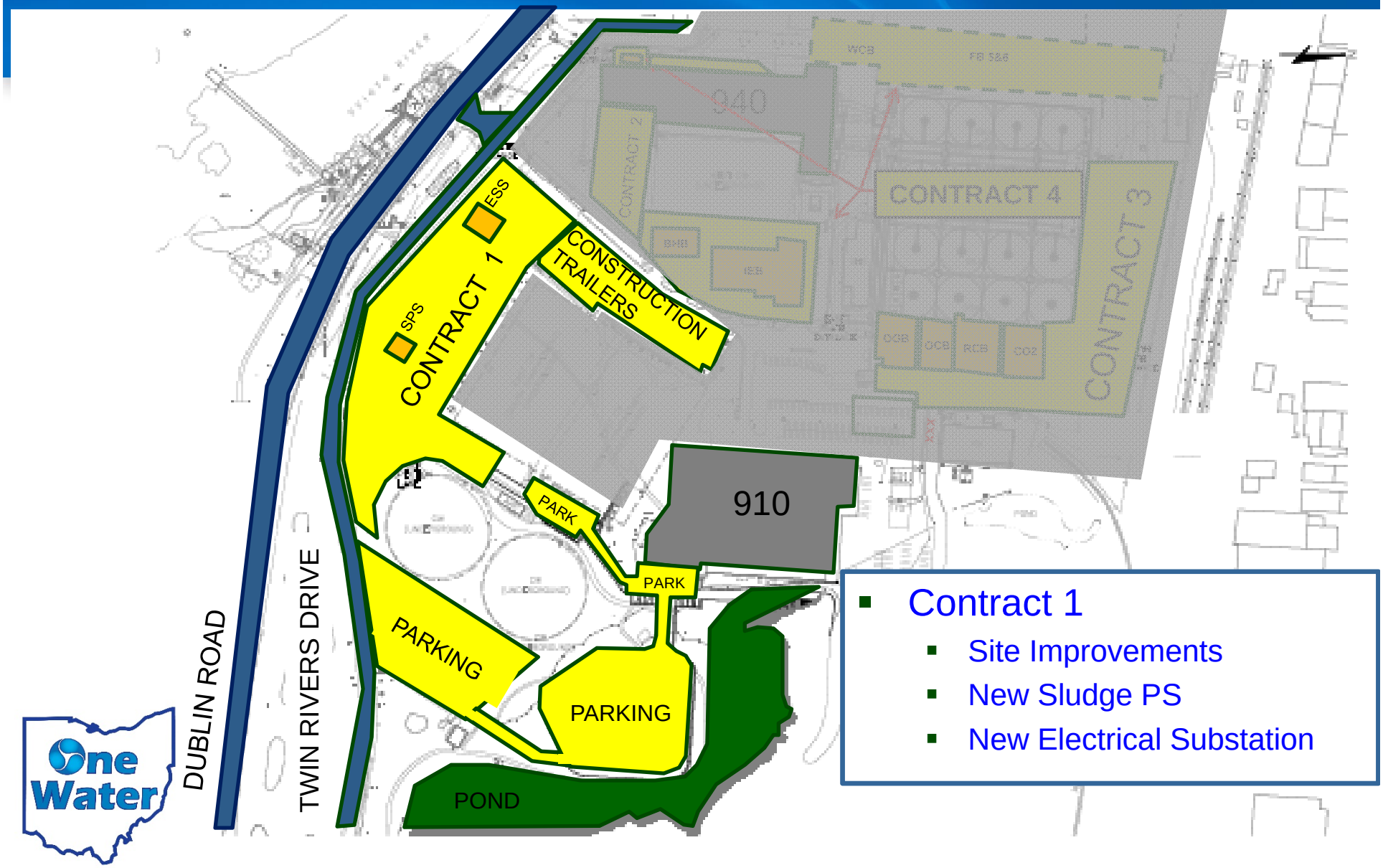


CURRENT PROGRAM STATUS

Status of Projects

- 4 of 5 Major Projects Bid to Date
- Final Project –Currently in Bid Phase
- Facilities Projects have included 4 – 6 Bidders
- Total Bids to Date: $ 99.5 M
- Estimate for Final Contract: $ 90 M

Contract 1



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

Contract 1

910 Building Parking Area and Sidewalks

Pervious Pavement Parking Lot

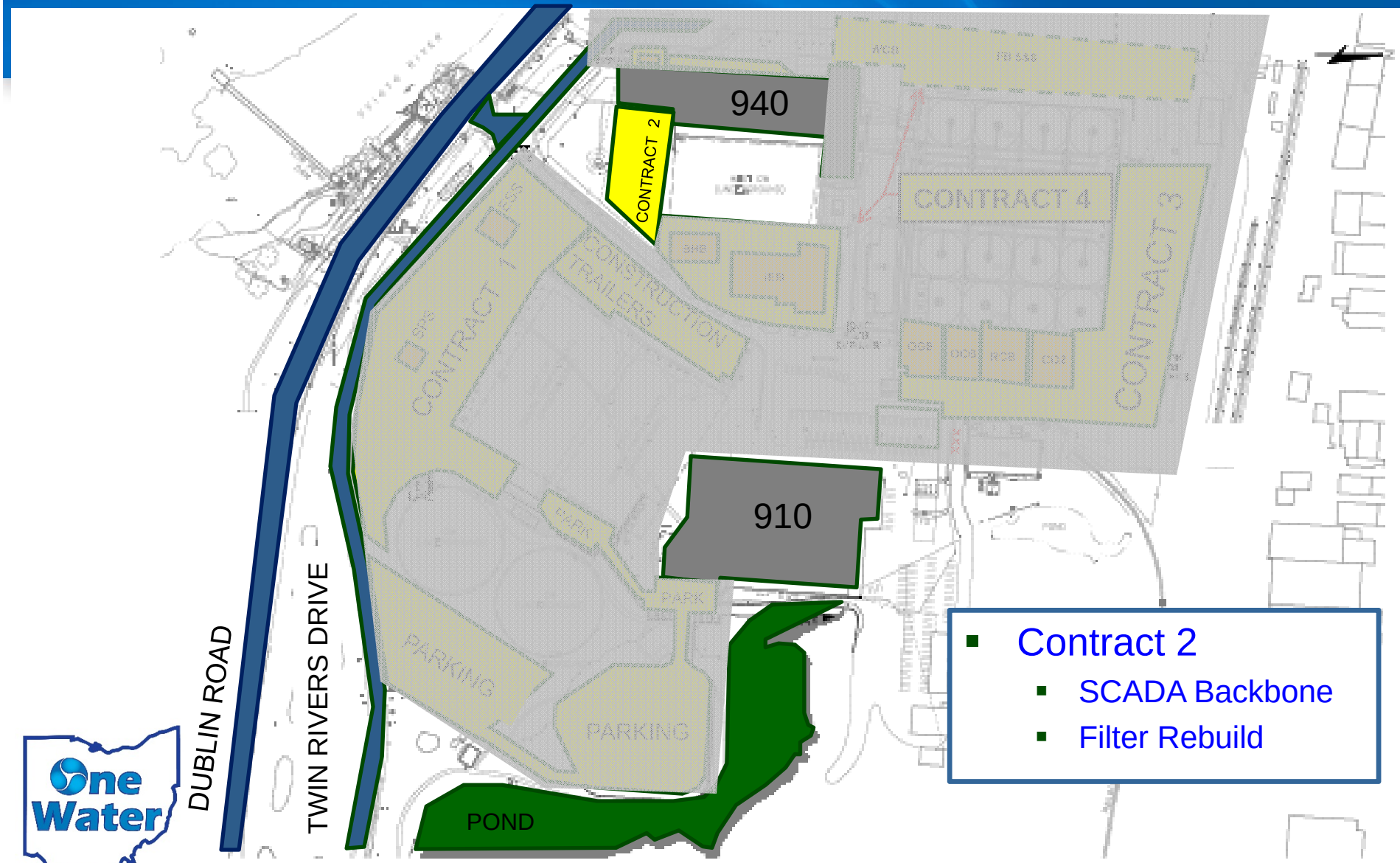
Contract 1

Sludge Pump Station

Electrical Substation

Contract 1

Contract 2



- Contract 2
  - SCADA Backbone
  - Filter Rebuild

Contract 2

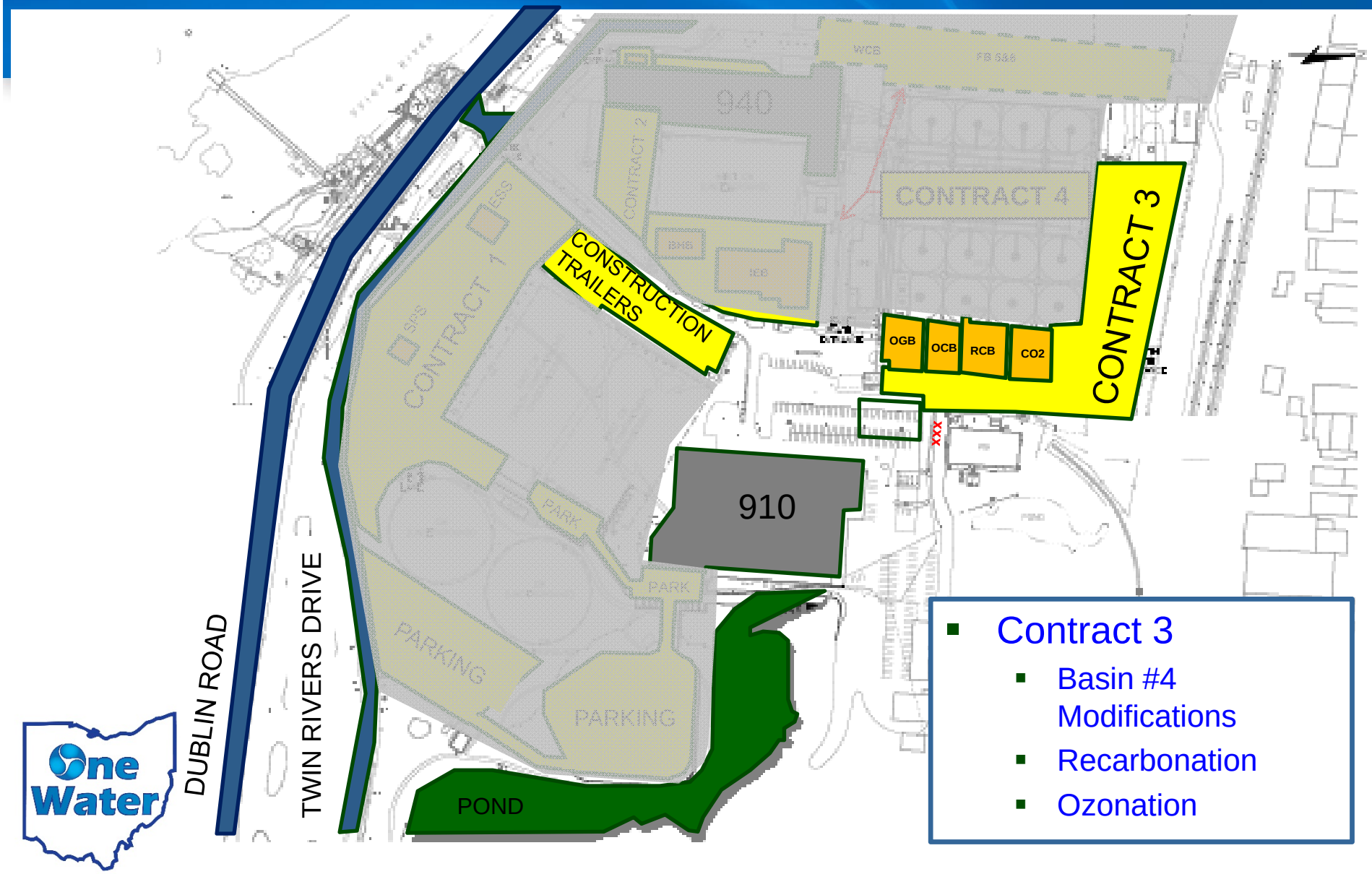
Filter Troughs

Air Scour Blower

Contract 2

Filter Underdrains

Contract 3



- Contract 3
  - Basin #4 Modifications
  - Recarbonation
  - Ozonation

Contract 3

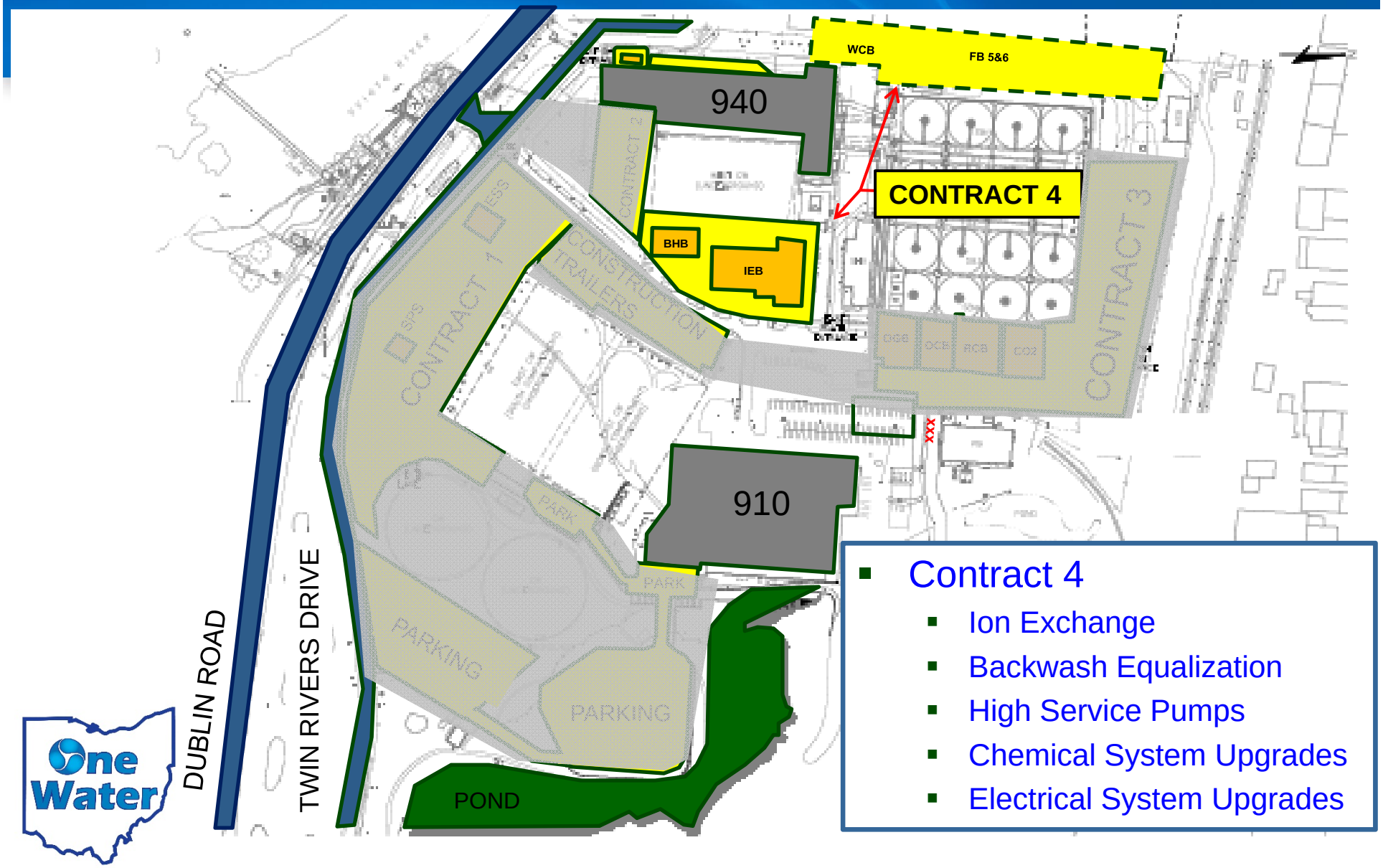
Recarbonation Basin and Channel

Ozone Facility

Contract 3

Ozone Facility and Recarbonation Basin

Contract 4



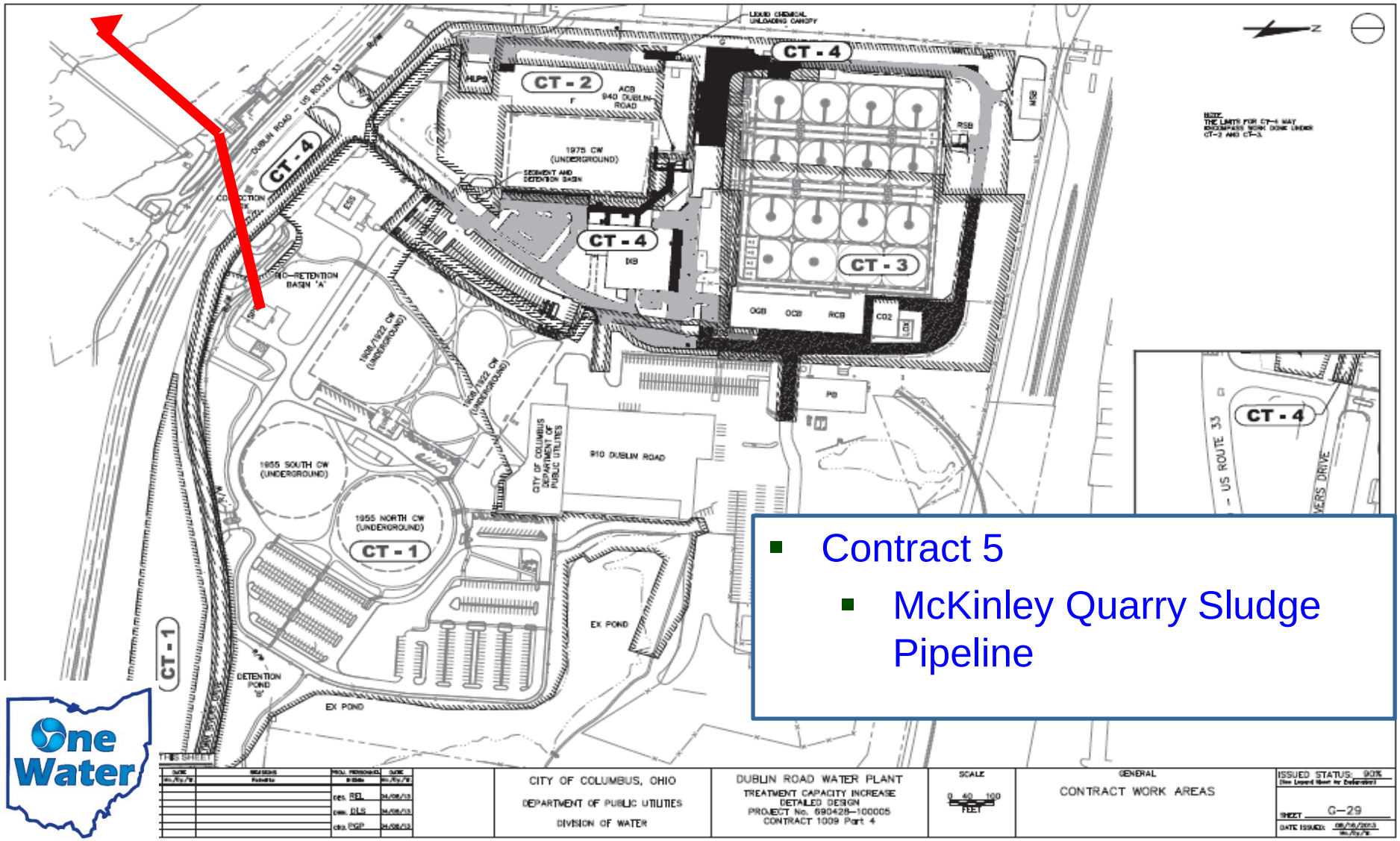
- Contract 4
  - Ion Exchange
  - Backwash Equalization
  - High Service Pumps
  - Chemical System Upgrades
  - Electrical System Upgrades

Contract 4- Ion Exchange & Plant Reliability Upgrades

- IX Nitrate Removal System – Nitrate Selective Resin
- Plant Reliability Upgrades
  - High Service Pumps
  - Electrical System - MCC's
  - Chemical Feed & Storage
    - Alum Tanks; Lime Slakers; etc.

- Current Status – Receive Bids September 17, 2014

Contract 5



- Contract 5
  - McKinley Quarry Sludge Pipeline

Acknowledgements

- City of Columbus – Division of Water
  - Rick Reinhold, PE – Project Manager
  - Matt Steele – Water Supply and Treatment Coordinator
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- CDM Smith
- Stantec
- Chester Engineers
- Prime AE Group

Questions?
Thank You

One Water

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