

Secondary Digester Cleaning to Meet Ohio Sludge Rules

Timothy McCann – AECOM

Keith Bovard – Rocky River WWTP



Agenda

- Rocky River WWTP Background
- Ohio Sludge Rules
- EPA Request for Alternative
- Digester Cleaning Project



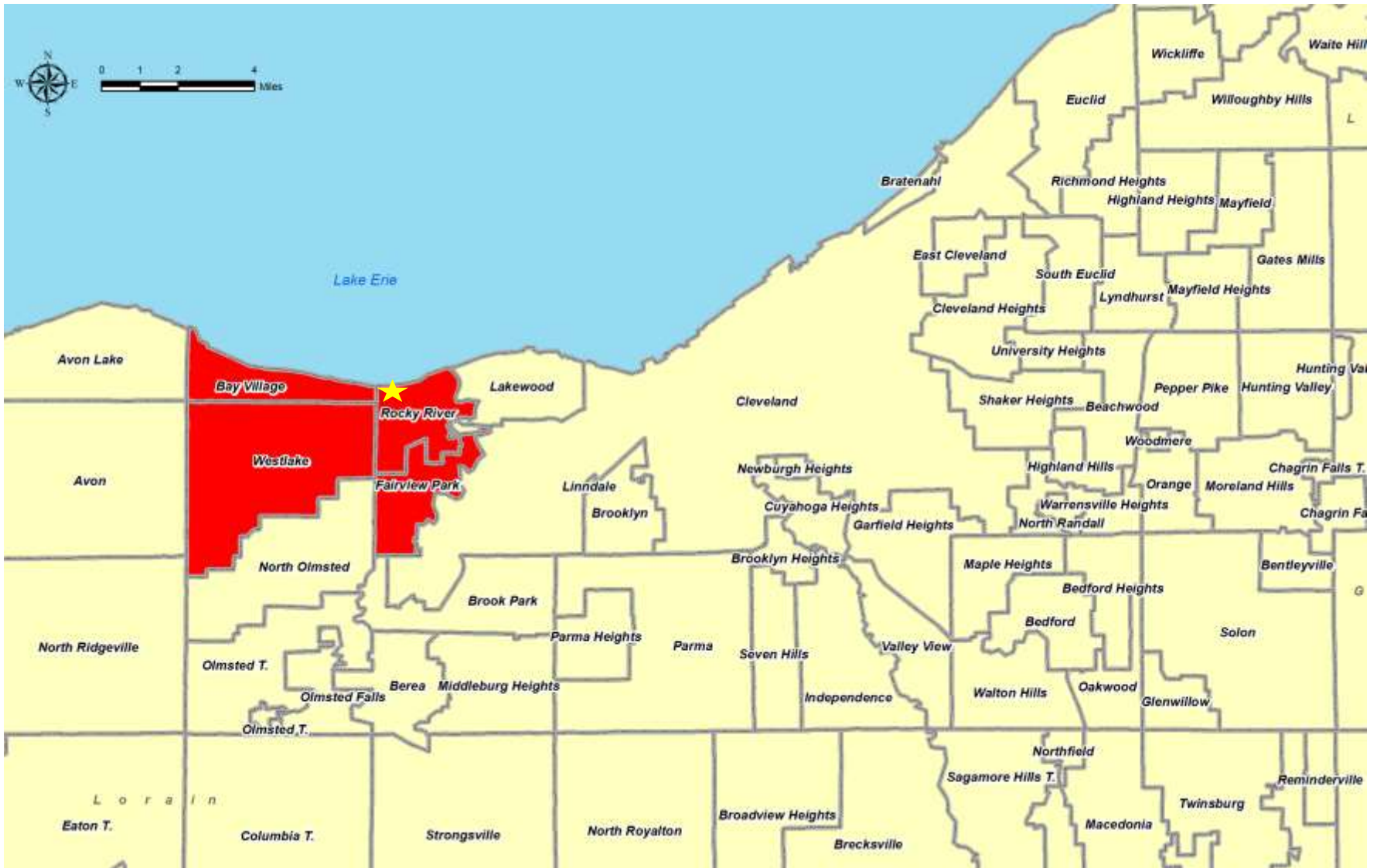
Rocky River WWTP Background and History

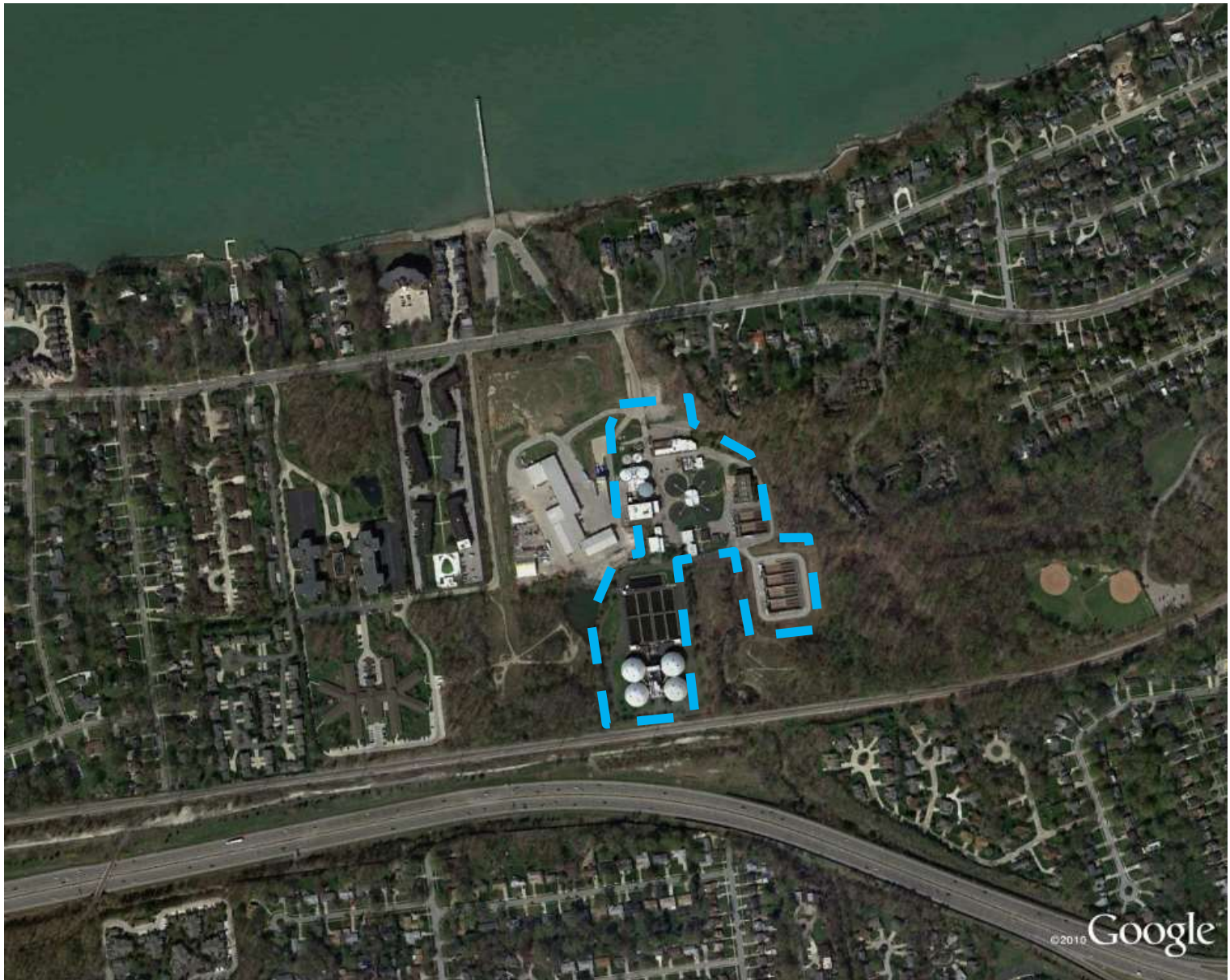
Rocky River WWTP Information

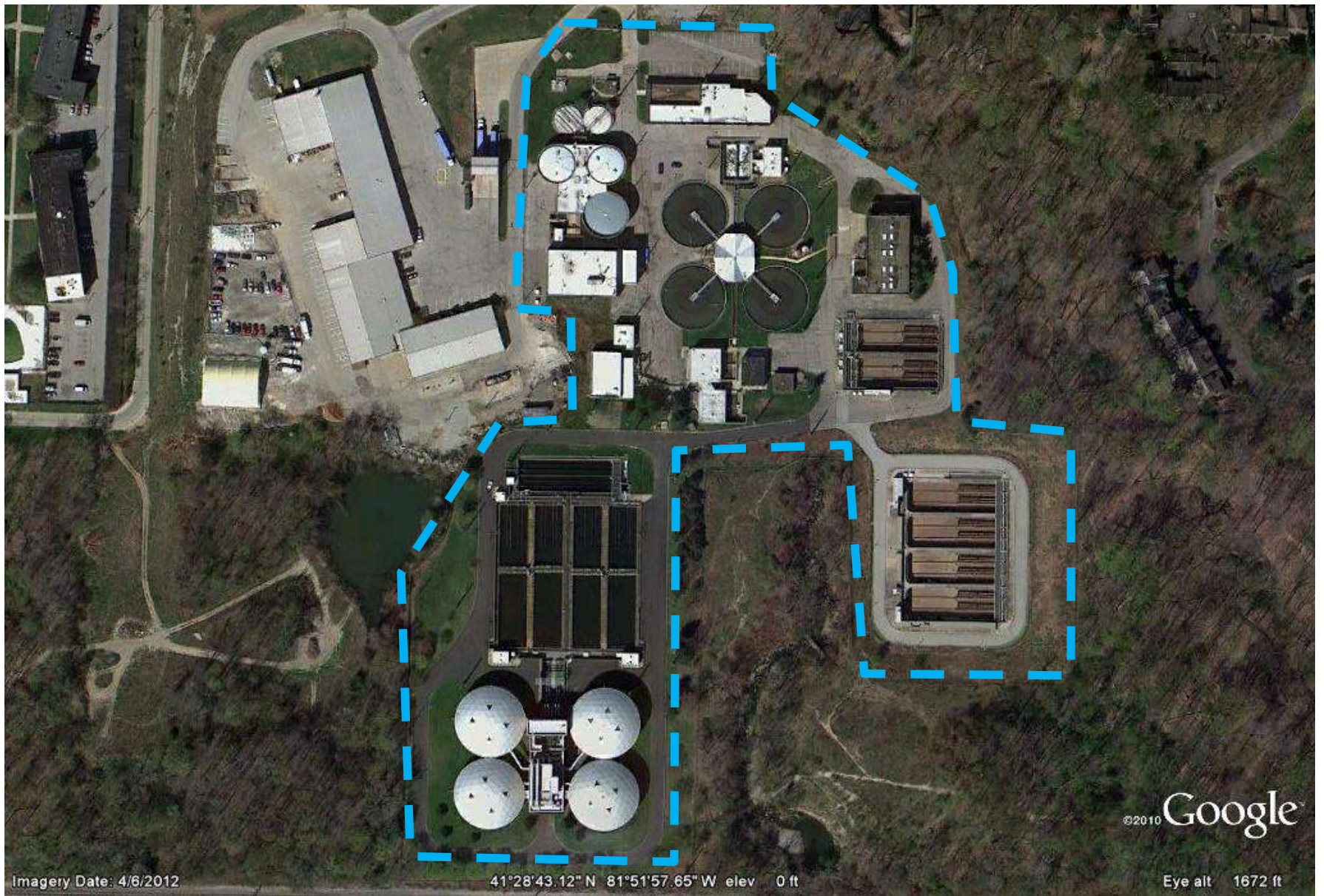
- Serves 4 Communities
 - Bay Village
 - Fairview Park
 - Rocky River
 - Westlake
- Design Flow: 22.5 MGD
- Average Flow: 12.5 MGD
- Peak Influent Flow: 170 MGD
 - February 2011 – High Recent Storms
 - All Flow Through Bar Screens



- Submerged Outfall







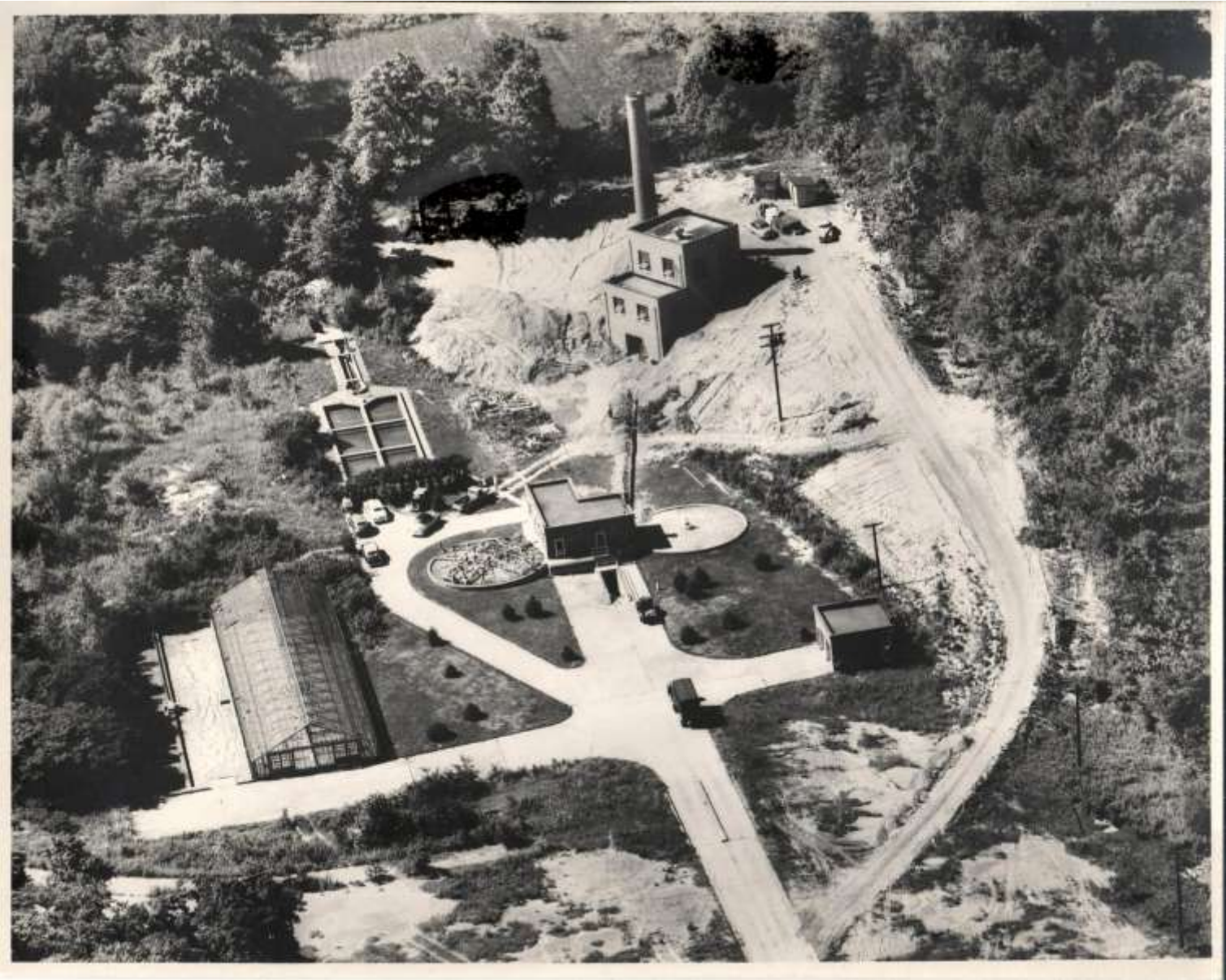
1937 Plant



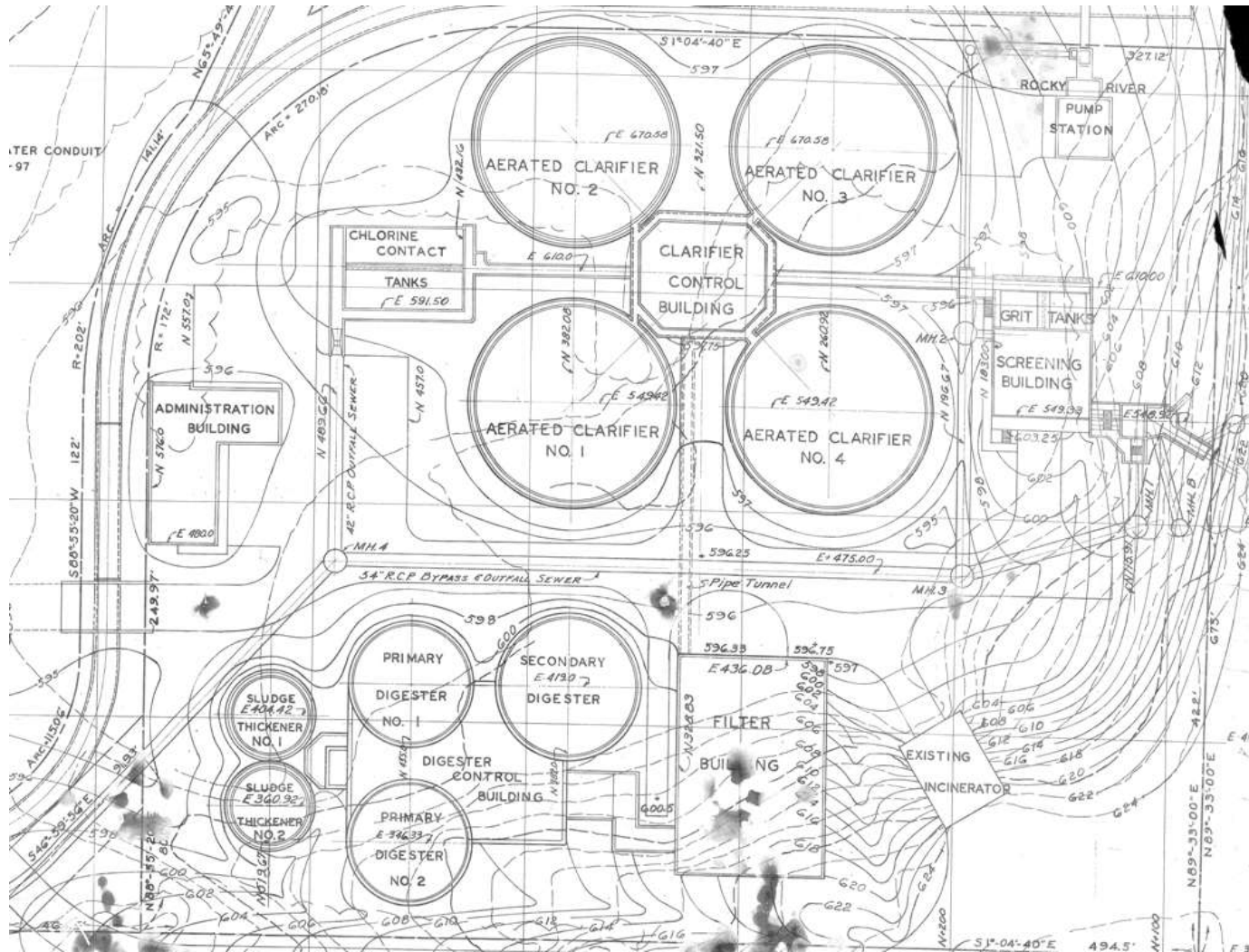
1937 Plant Description

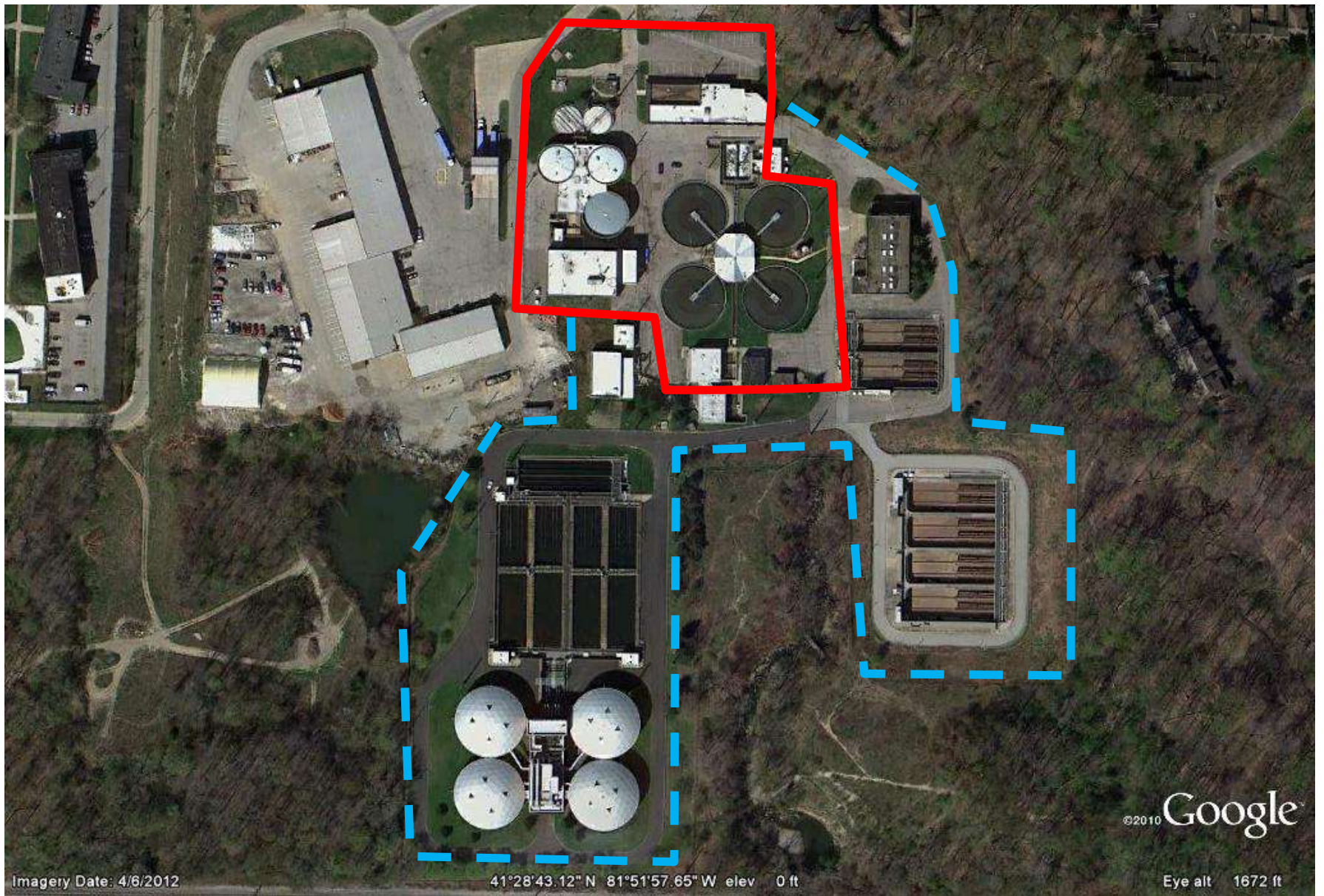
- Grit Chamber
- Settling Tank
- Anaerobic Digestion
- Sludge Drying Beds
- Discharge to Spencer Creek
- Provided Capacity & Function Until 1960s





1961 Plant





1961 Plant Modifications

- Additional Screening & Comminutor
- Aerated Grit Removal
- Chemical Coagulant Feed
- Primary Clarification
- Effluent Chlorination
- Submerged Outfall to Lake Erie
- Sludge Thickeners and Anaerobic Digesters
- Vacuum Filtration and Sludge Incinerator



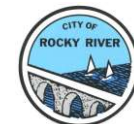
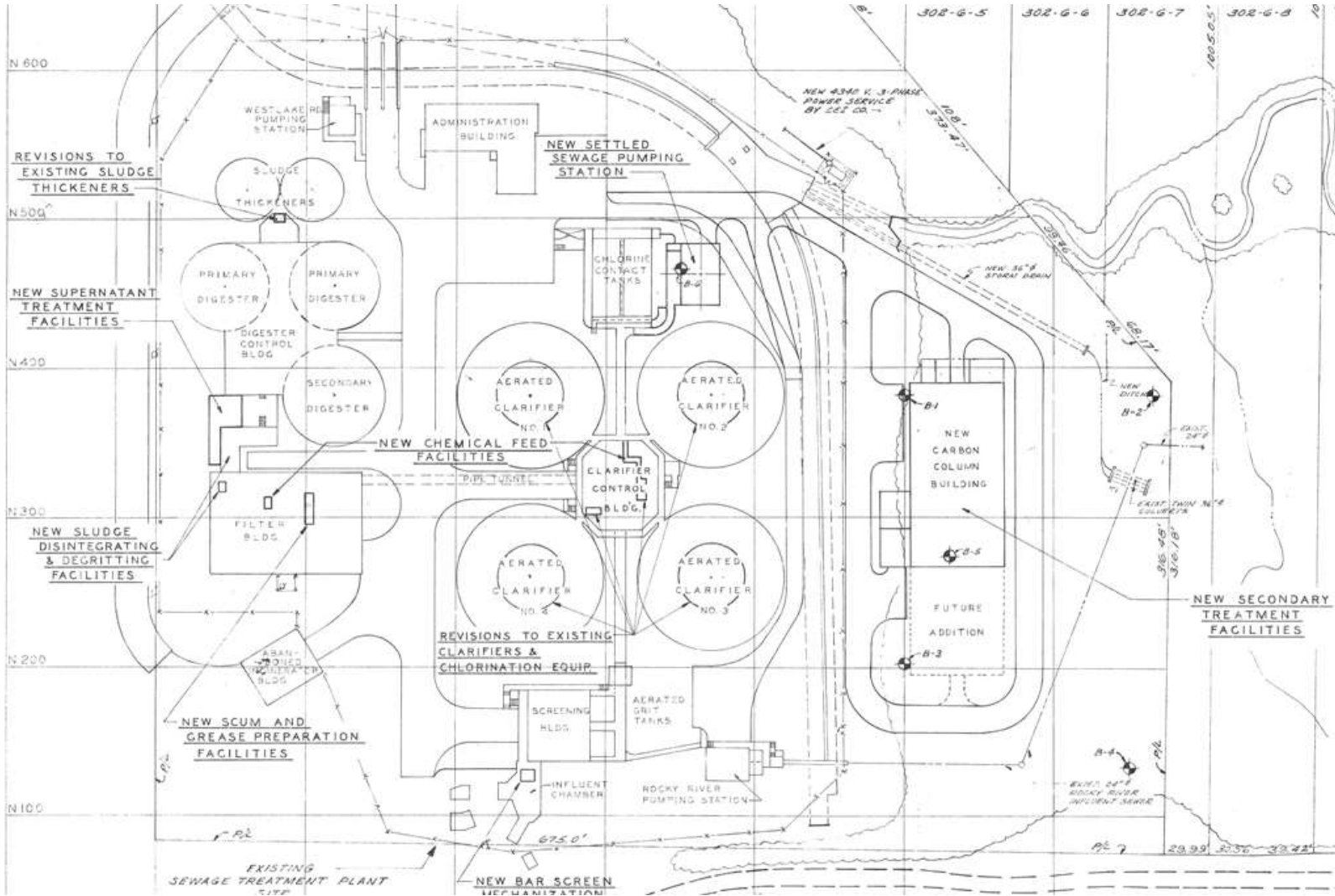
1961 Construction Photos

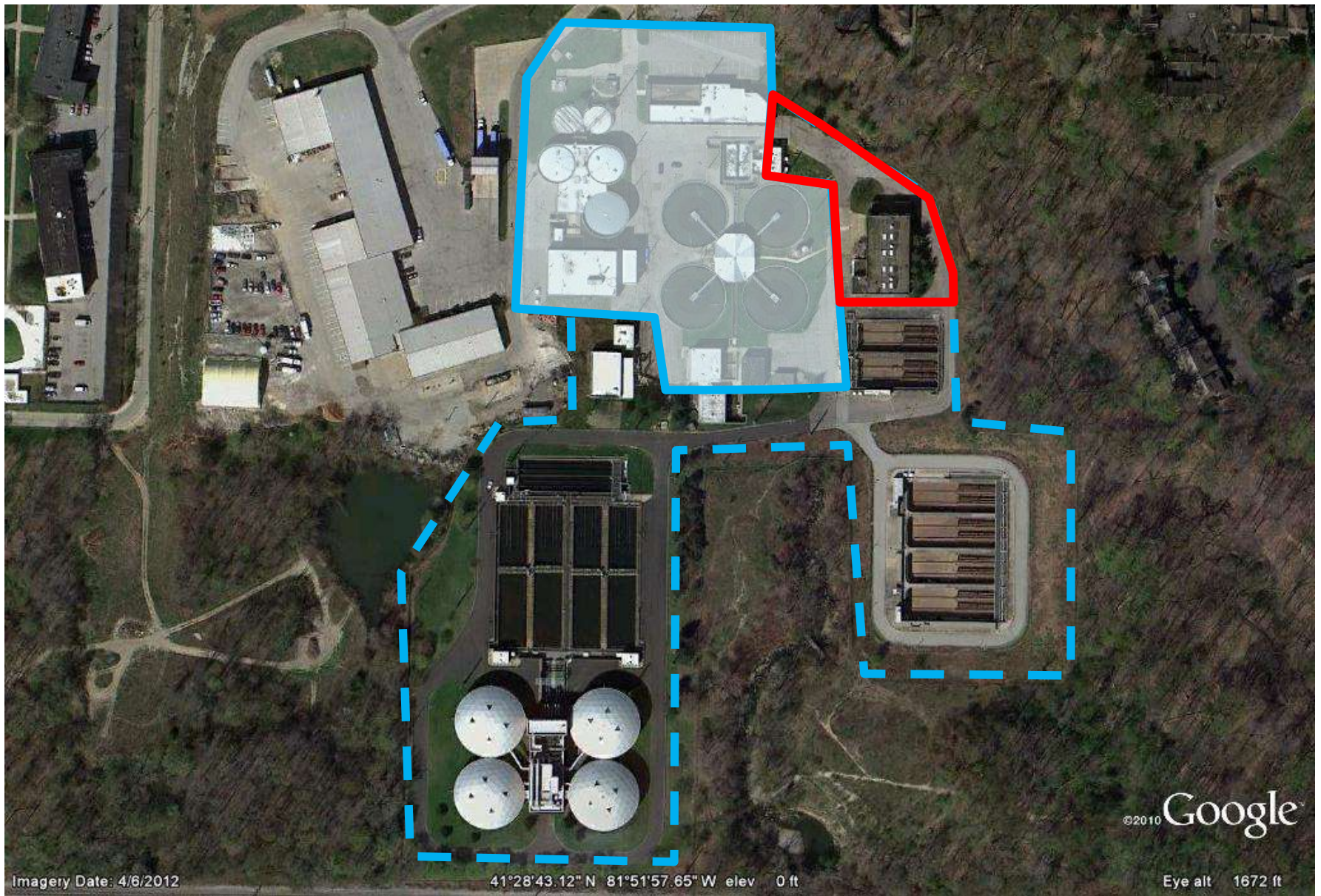


1961 Construction Photos Cont.



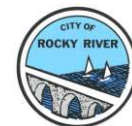
1975 Plant



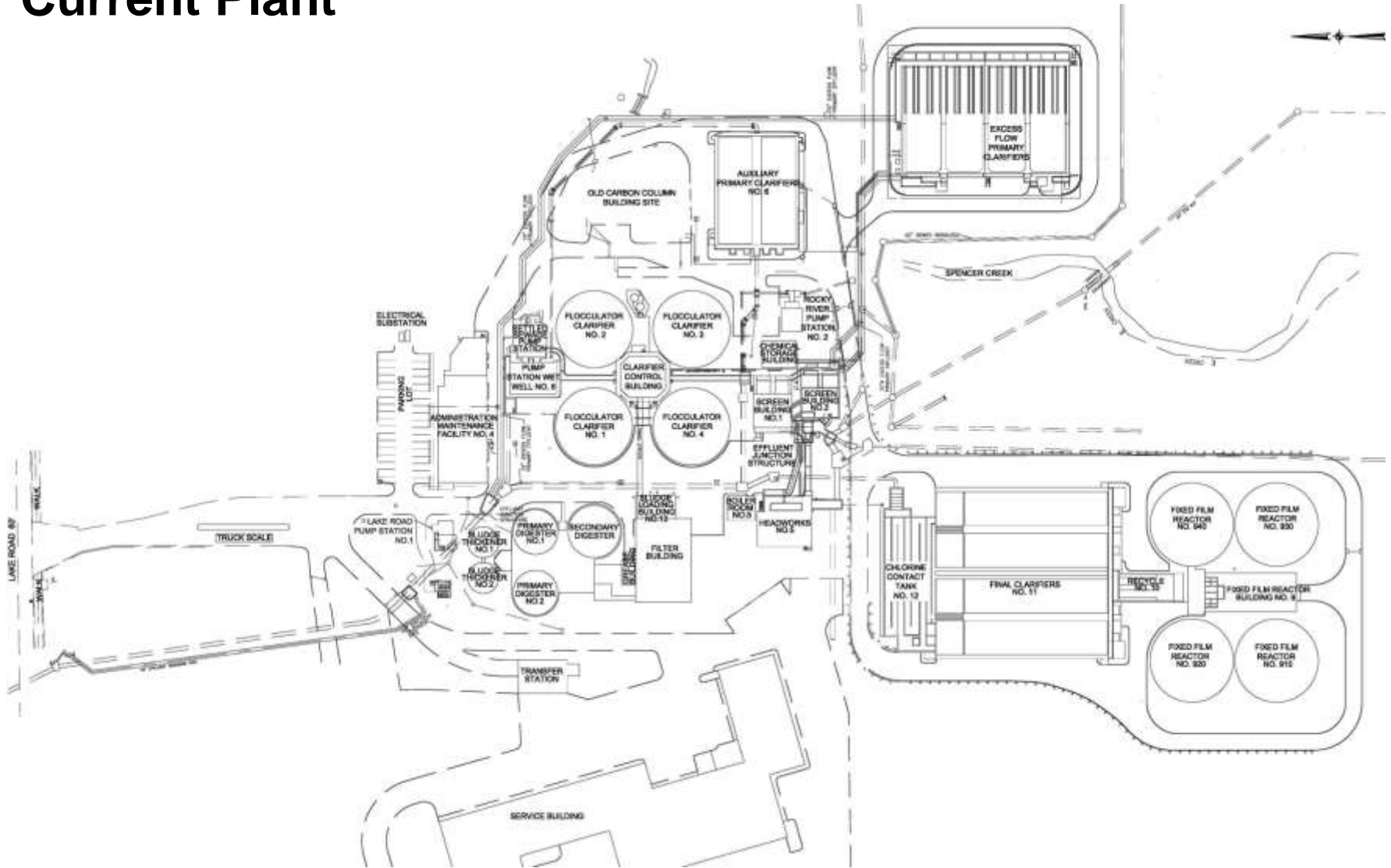


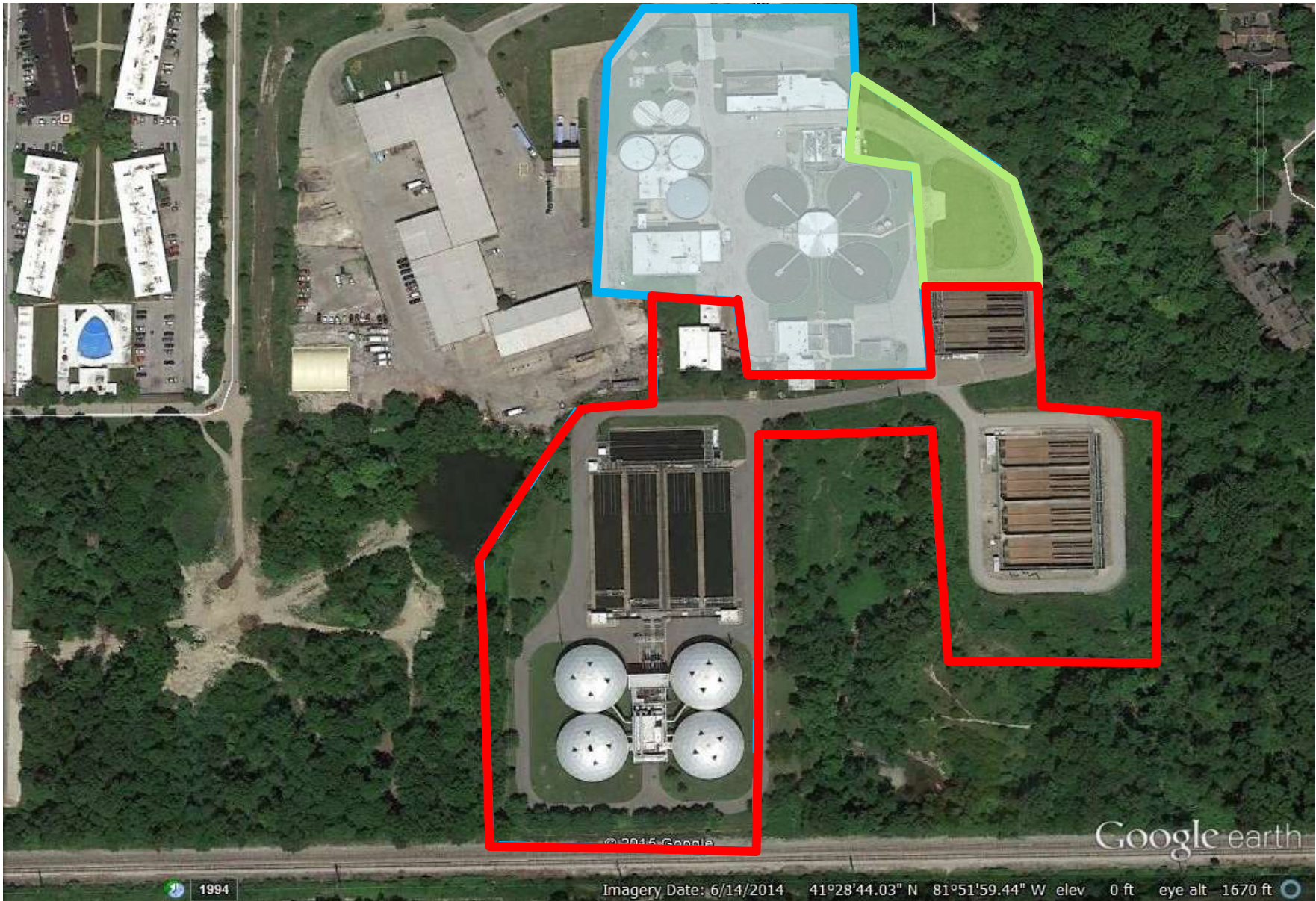
1975 Plant Modifications

- Ohio Water Pollution Control Board
 - 1965 – Required Secondary Treatment
 - Average Flow: 10 MGD
 - Peak Flow: 20 MGD
- Granular Activated Carbon Filtration & Adsorption
- Added Settled Sewage Pump Station to Carbon Facility
- Additional Minor Upgrades
- Carbon Treatment Operated Less than One Year



Current Plant





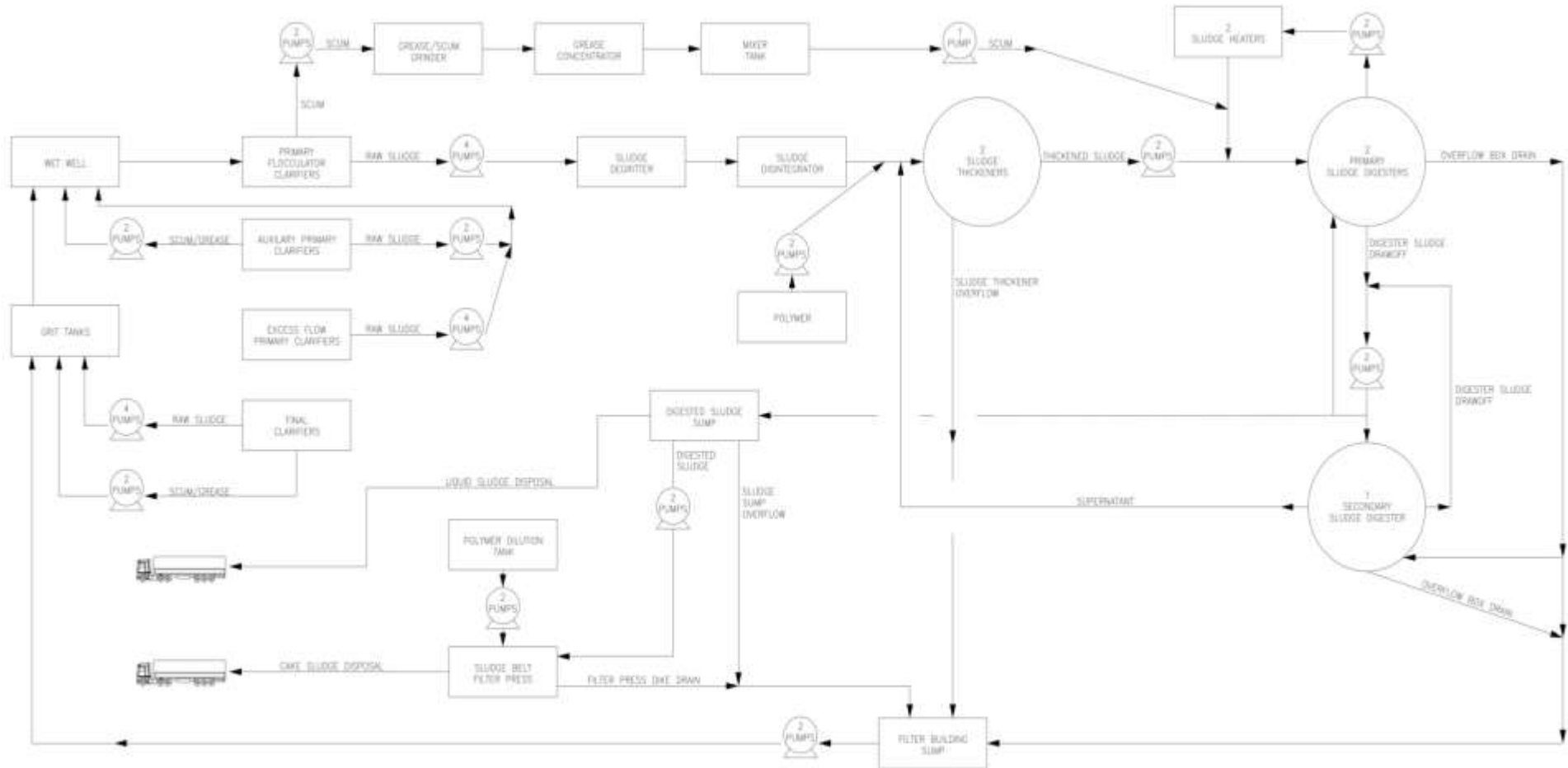
Current Plant

- Added four Fixed Film Reactors & Final Clarifiers
- Chlorine Contact Tanks
- Modified Settled Sewage Pump Station
 - 45 MGD Capacity
 - Four 15 MGD Pumps
 - 42-inch Force Main to Reactor Building
- Additional Clarifier Tanks
- Demolished Carbon Building

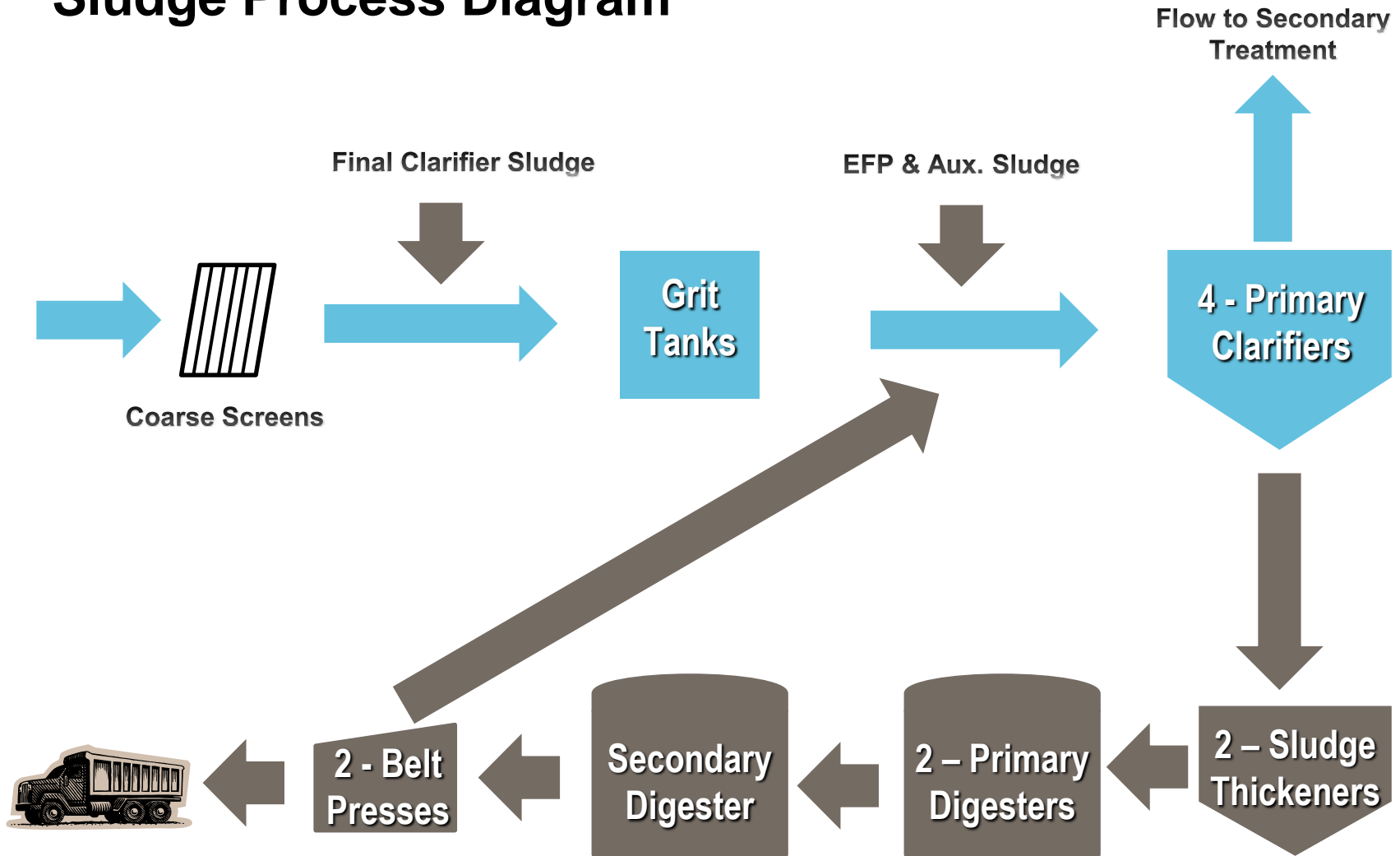


Rocky River WWTP Sludge Process

Overall Sludge Process



Sludge Process Diagram



Sludge Facilities



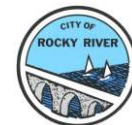
- Sludge Thickeners (2)
 - 78,500 gallons
- Primary Digesters (2)
 - 450,000 gallons
 - Anaerobic, completely mixed
- Secondary Digester
 - 570,000 gallons
- Digested Sludge Sump
 - 15,700 gallons
- Belt Presses (2)
 - 2,350 lbs/hour
- 1,600 – 1,700 dry tons/year

Ohio Sludge Rules Brief Description

Ohio EPA's Biosolids Program

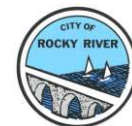


- Regulate Disposal & Beneficial Use
- In Accordance with 40 CFR 503
- Sewage Sludge
- Other Biosolids
- Goals
 - Protect Public Health/Environment
 - Encourage Beneficial Reuse
 - Minimize Odors



Sludge Categories

- Sludge is the residual solids resulted from physical, chemical or biological treatment. Three types depending on origin
 - Municipal sludge:
 - Primary sludge (termed residuals or solids)
 - Secondary sludge (termed residuals or solids)
 - Mixed sludge (mixture of the two above)
 - Tertiary/chemical sludge (termed residuals or solids)
 - Industrial sludge
 - Drinking water treatment sludge



Pathogen Reduction for Land Application

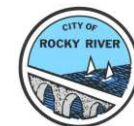
Exceptional Quality

1. Use of Pathogen Reduction
 - P-8 to P-16
 - Require testing for fecal coliforms or salmonella:
 - FC < 1,000 MPN / g TS (dry)
 - Salmonella sp. < 3 MPN / g TS (dry)
2. Vector Attraction Reduction
 - VAR-1 to VAR-8

– No site restrictions for Class A; site restrictions for Class B

Class B

1. Use of Pathogen Reduction
 - P-1 to P-16
2. Vector Attraction Reduction
 - VAR-1 to VAR-10



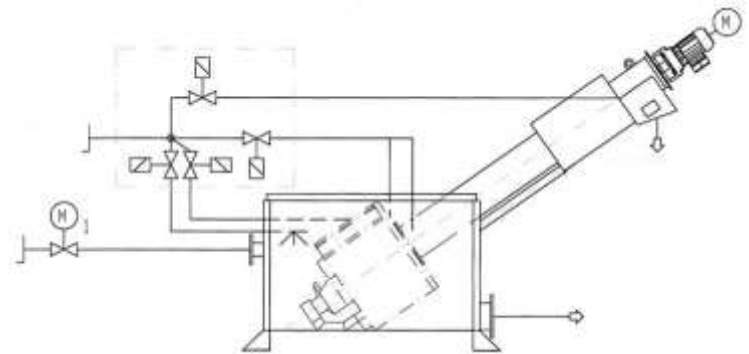
Ohio Sludge Rules - Screening

- OAC 3754-40-02(C)(3)(a) – Remove Manufactured Inerts
 - (i) Screen Influent Wastewater - 5/8-inch aperture
 - (ii) Screen Biosolids – 5/8-inch aperture
 - (iii) Director’s Approval – Alternative Method = (i) or (ii)



Preliminary Sludge Treatment – Sludge Screening

- Sludge Screening
 - Types Available:
 - Inline
 - Rotary Drum



Inline Sludge Screen

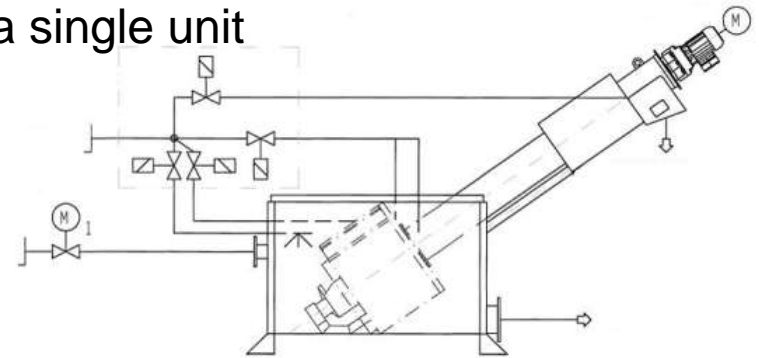


Rotary Drum Sludge Screen

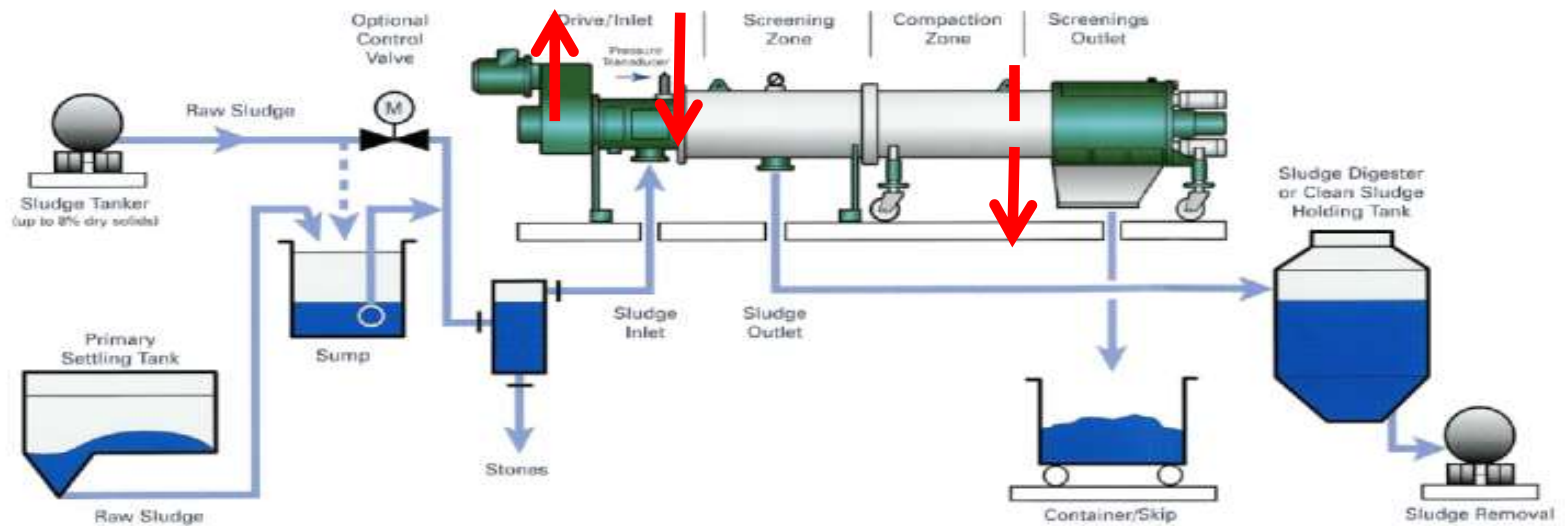
Sludge Screening – Rotary Drum Screens

Rotary Drum Screens:

- Pump to only, additional pumping required
 - Screening, dewatering & compacting in a single unit
 - Fully automatic
 - Continuous operation
 - Requires covers and odor control
 - Washwater/spray water required
-
- **Manufacturers:**
 - Huber Technology
 - Lakeside



Sludge Screening – Inline Screens



Inline Screening Process

Sludge Screening – Inline Screens

Inline Screens:

- Pump through system, no additional pumping required
- 95% capture rate
- 35 to 45% dry solids
- Screening, dewatering & compacting in a single unit
- Fully automatic
- Continuous operation
- No odors
- Not washwater or spray water
- Requires compressed air

- Machine Capacity:
 - One size machine only
 - 440 gpm @ 1% solids
 - 155 gpm @ 8% solids

- Manufacturers:
 - Huber Technology
 - Hydro International



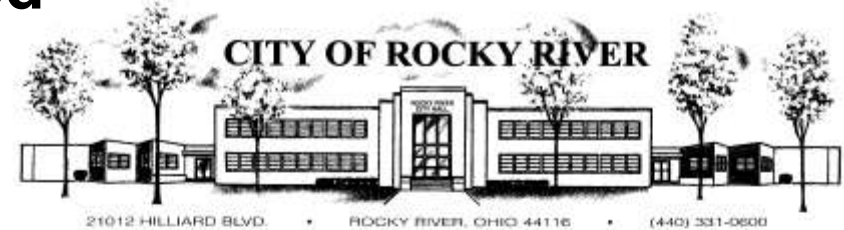
Screening Added to Ohio Sludge Rules

- 2009 - Rocky River WWTP Installed New 3/4-inch Aperture Screens
- May 22, 2009 – Ohio EPA Commenting Ends on New Sludge Rules
 - Synagro Commented to Add 3/8-inch Screens
 - City of Columbus Countered Asking for 5/8-inch Screens



Request for Alternative Method

- Request to Ohio EPA
- First Request in the State
- Worked with Ohio EPA
- Made Case
 - Influent Screens Installed Just Before New Sludge Rules
 - Highly Effective New Screens
 - Cost Prohibitive – Retrofit Screens
 - Cost Prohibitive – Sludge Screens
 - Cleaned Primary Digesters in 2000
 - Cleaned Sludge Thickeners in 2013
 - **Clean Secondary Digester**



WASTEWATER TREATMENT PLANT
22303 LAKE ROAD
ROCKY RIVER, OHIO 44116
(440) 356-5640
FAX (440) 356-5629

PAMELA E. ROBST
MAYOR

May 30, 2014

Ohio EPA, Northeast District Office
Attn: Chris Moody, Sewage Sludge Coordinator
2110 East Aurora Road
Twinsburg, Ohio 44087

RE: WWTP Biosolids Screening Requirements OAC 3745-40-02(C)(3)(a)

Dear Mr. Moody:

The City of Rocky River WWTP, OH0030503, Ohio EPA NPDES No. 3PE00009*KD, would like to be considered for approval for an alternative method that achieves a removal rate equal to or greater than the two initial options, OAC 3745-40-02(C)(3)(a)(i) and OAC 3745-40-02(C)(3)(a)(ii), influent and biosolids screening at a maximum of five-eighths inch.

The Rocky River WWTP has five, six-foot wide bar screens which contain spacing between bars of three-quarters of an inch and each have a capacity of 37.5 MGD. They were originally placed into service in 1985 and were replaced with new units in spring of 2009 with the same bar spacing.

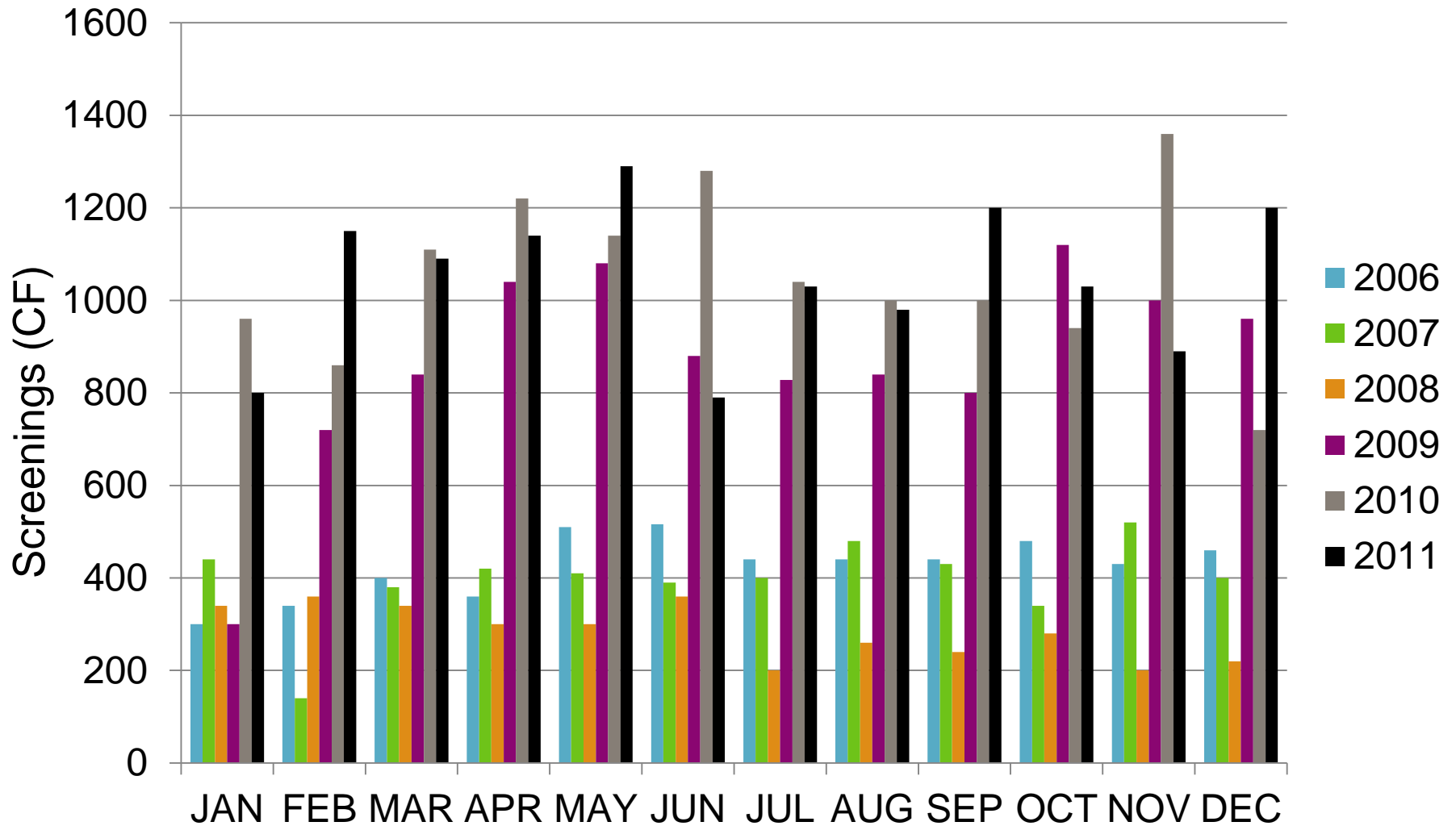
A construction contract was approved for the new bar screens on May 12, 2008 (prior to the OEPA draft sludge rules comment period indicating three-eighth inch requirement, Exhibit A) with the final install in March of 2009 at a final cost of \$759,000. On May 22, 2009, another Ohio EPA sludge rule comment period ending on May 22, 2009, indicated going to a five-eighths inch bar screen (see Exhibit B). The City of Rocky River would have considered changing the bar screen from three-quarters inch to five-eighth if the rules were applicable prior to the design period. Changing the newer, very efficient bar screen would be very costly and the estimated cost for equipment to screen only the anaerobic digested biosolids would be \$585,000 (not including design).

Since the installation of the new bar screens and their associated controls, the WWTP has had an average increase in removal rate of 160% of screenings from the influent of the Plant (see Exhibit C).

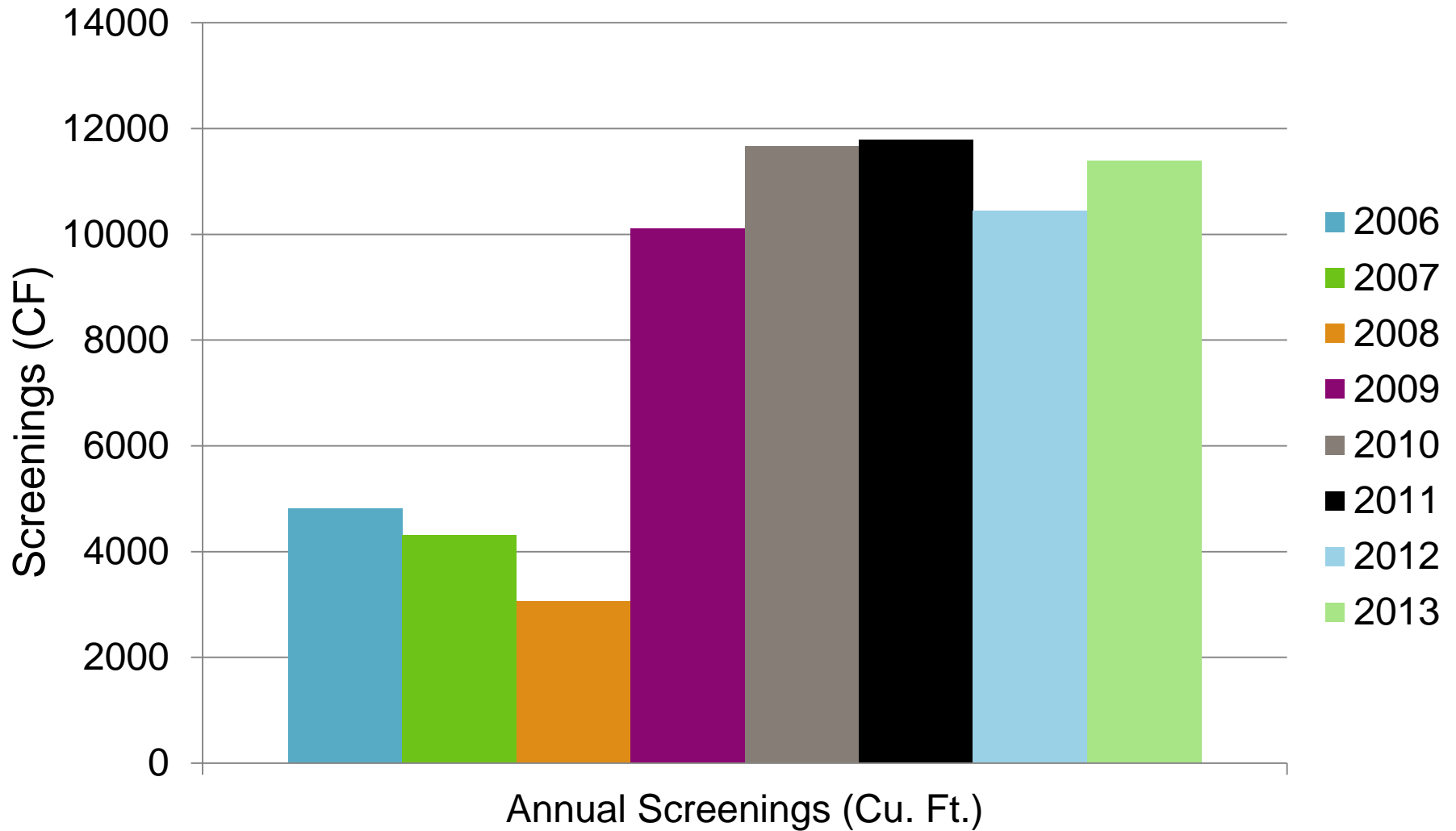


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Rocky River WWTP – Influent Wastewater Screening



Rocky River WWTP – Influent Wastewater Screening



Primary Digesters and Sludge Thickener Cleaning

- Cleaned Primary Clarifiers
- Cleaned Primary Digesters
- Cleaned Sludge Thickeners



Ohio EPA Decision

- Director Approval
- Alternative Screening
- No Manufactured Inert Issues
- Secondary Digester Cleaning by December 31, 2014



John R. Kasich, Governor
Mary Taylor, Lt. Governor
Craig W. Butler, Director

RECEIVED

JUL 28 2014

BY: *[Handwritten Signature]*

July 28, 2014

RE: CUYAHOGA COUNTY
ROCKY RIVER WWTP
NPDES PERMIT NO. OH0030503
OHIO EPA PERMIT NO. 3PE00009*KD
ALTERNATIVE SCREENING METHOD
REQUEST

Mr. Jeffrey Harrington, Superintendent
City of Rocky River
22303 Lake Road
Rocky River, OH 44116

Dear Mr. Harrington:

On June 3, 2014, Ohio EPA received a copy of your request for approval of an alternative screening method that achieves a removal rate equal to or greater than screening with a maximum aperture of five-eighths inch bar screen.

Information provided within the alternative screening request indicates that in 2009 the City of Rocky River wastewater treatment plant (WWTP) installed a more efficient three-quarter inch aperture bar screen. This improved the manufactured inert removal rate efficiency by 160 percent. The WWTP has also previously cleaned the two primary digesters in 2000 and plans to clean the secondary storage digester by December 31, 2014 to remove inert material.

After a review of the information provided within the alternative screening method request and since Ohio EPA has not had any manufactured inert issues regarding the WWTP's biosolids beneficial use program, in accordance with Ohio Administrative Code Chapter (OAC) 3745-40-02(C)(3)(a)(iii), Ohio EPA approves the WWTP's request for an alternative screening method.

50 West Town Street • Suite 700 • P.O. Box 1049 • Columbus, OH 43216-1049
www.epa.ohio.gov • (614) 644-3020 • (614) 644-3184 (fax)



Secondary Digester Cleaning

Project Design

- Digester Volume – 435,773 gallons
- Process Problems with Solids in Digester
- Specific Gravity – 1.02
- Estimated Wet Weight 3,707,033 lbs
- Estimated Percent Total Solids – 20%
- Estimate Total Dry Solids – 741,407 lbs
- **371 Dry Tons Solids - ESTIMATED**



Maintaining Operations – 10 States Standards



- Sec. 53.6 – Arrangement of Units
 - Arrange units for O&M convenience
 - Flexibility and ease of installation of future additions
 - Continuous quality effluent
 - Economical additions
- Sec. 54.2 – Unit Bypasses
 - Maintenance & emergencies
 - Operation during maintenance

Temporary Sludge Storage – Secondary Digester

- Evaluated Options

1. Temporary Tankers

- Potential for Spillage
- Piping Modifications
- Pump Needed

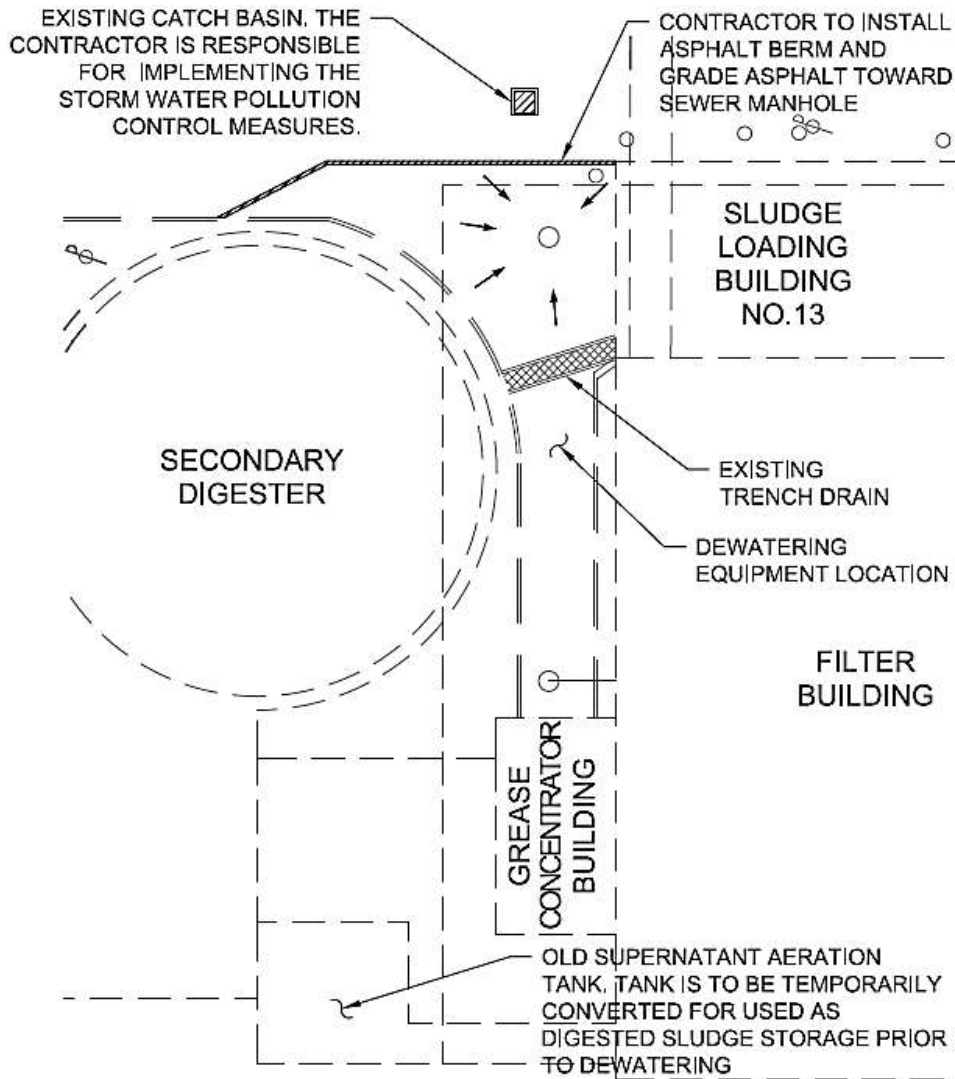


2. Use Old Supernatant Aeration Tank

- Contain Any Spills
- Minimal Piping Modifications
- Pump Needed



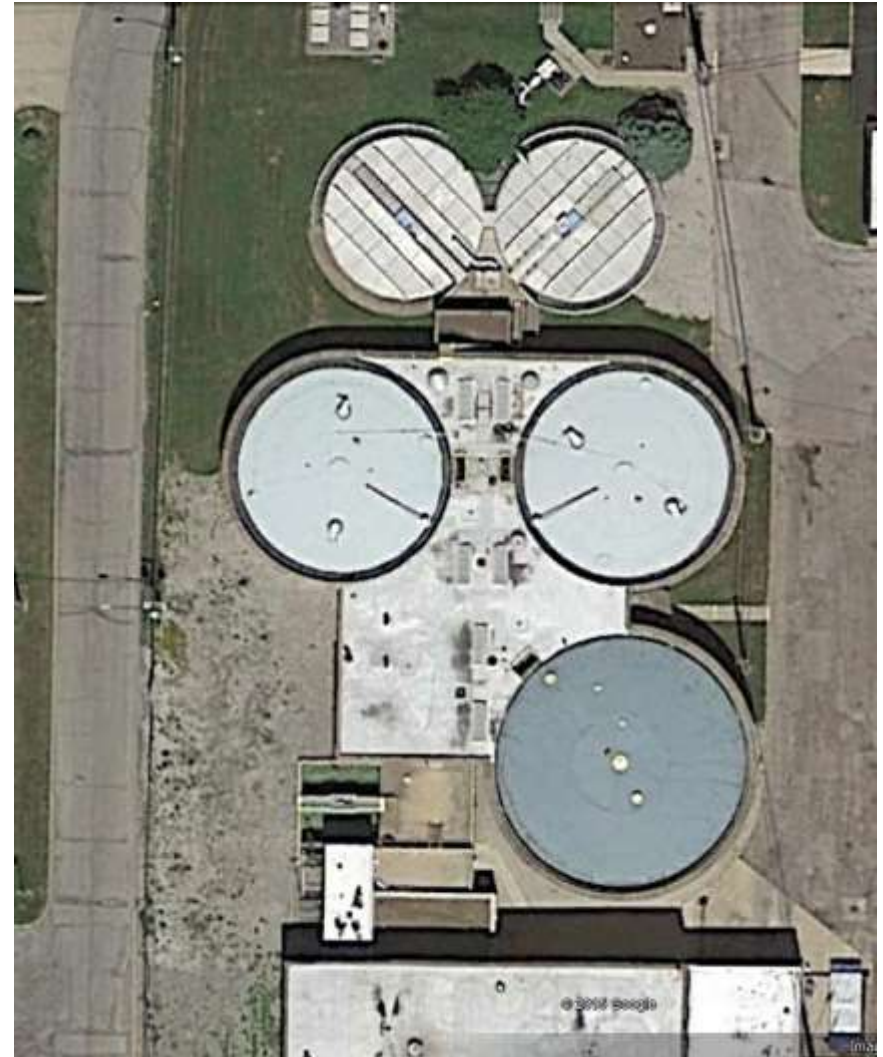
Designed Layout



- Concerned for Potential Discharge to Storm Sewer
- Design Called for Asphalt Berm
- Maintain Existing Sludge Loading
- Protect Catch Basin

Aerial Site Layout

- Sludge Thickeners
- Primary Digesters
- Secondary Digester
- Filter Building



Bidding Options

- Lump Sum
 - Pay for more than what is actually removed
 - Contractor needs to add money into bid
- Wet Ton
 - Dewatering not taken into account
 - Maybe more than needed
- **Dry Ton – Selected**
 - Contractor removes water
 - Only pay for solids removed



Digester Cleaning

- Agri-Sludge, Inc. – Shreve, OH
- Experience Across Ohio
- Biosolids Removal Services Since 1977
- Nerone and Sons, Inc.
Subcontractor for Temporary Piping and Additional Work



Temporary Storage Piping

- Piping to Temporary Storage Tank and Filter Press Well
- Change During Construction
 - No Pumps Needed



Temporary Storage Piping Cont.

- Simple to Modify...



- ...and Return to Original



Odor Control



- Temporary Sludge Storage Tank
- Tent to Keep Odors Contained



- Concern for Neighbors
- Letter to Residents to Inform of Project
- No Odor Issues

Sludge Press

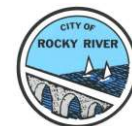
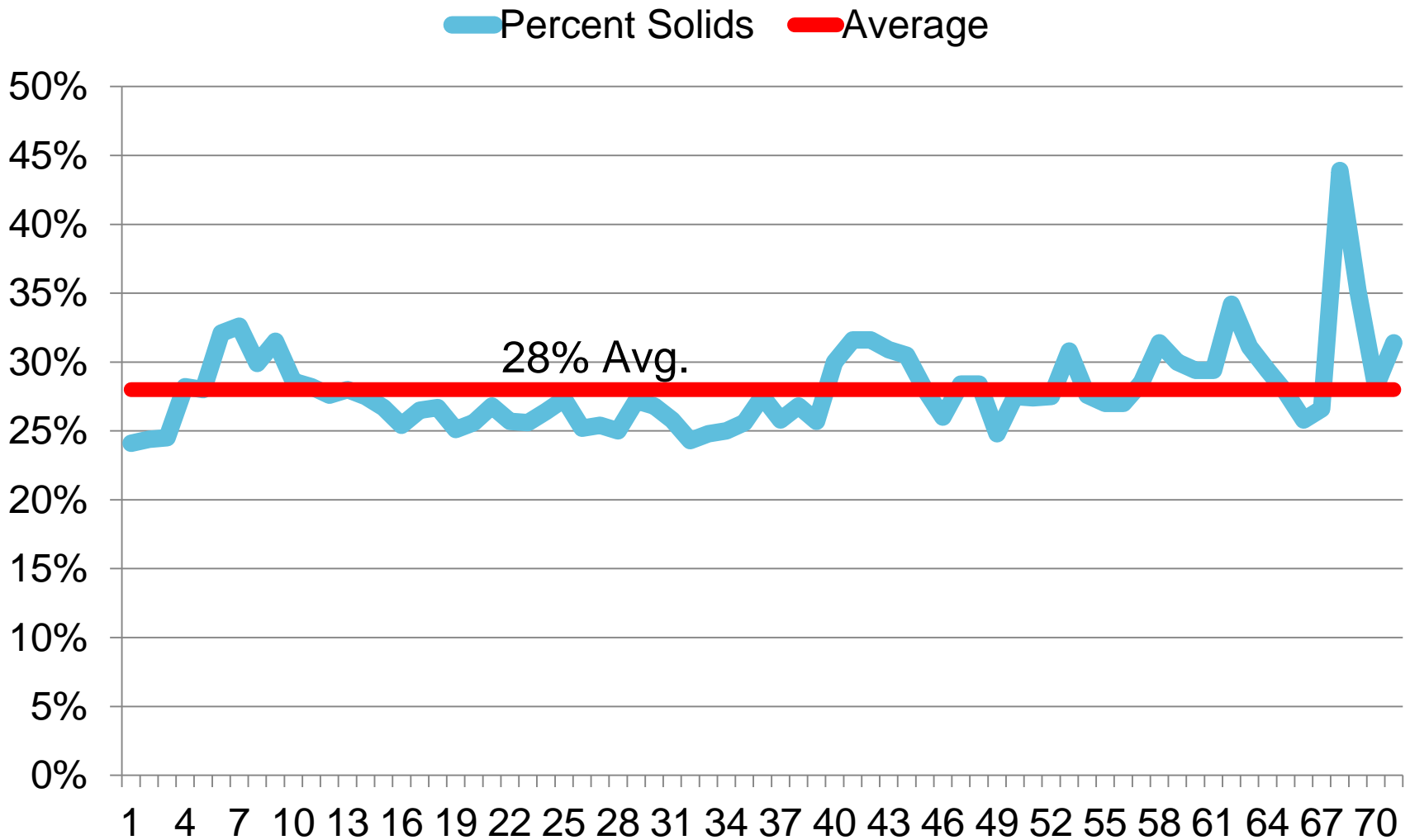


- Press Setup with Feed Tank
- Late Fall to End of Year
- Time Off for Holidays

- Sludge Dewatering



Sludge Percent Solids Removed



Secondary Digester Access



- Center Access
- Pump Lowered in Place

- Man Access
- Fall Protection



Digester Cleaning Pump



- Godwin Hydraulic Pump



Dewatering Setup



- Sludge to Press through a Grinder

- Conveyor to Trucks
- Two Trucks per Day
- Easy Access



Digester Inspection



- Entry to Inspect Digester Interior Condition



- Found Some Modifications
- Overall Good Condition

Digester Inspection Cont.

- Replaced Gas Pipe
- Removed Pipe/Patched Hole
- Installed Clamps



Project Results

- 363 Dry Tons of Sludge Sent to Landfill
- Project Estimated 371 Dry Tons
- Additional Repairs Inside Digester Following Cleaning
- Plant and Digestion Process Operated throughout Cleaning



Happy Thoughts



Questions?

Thank You



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timothy.mccann@aecom.com

Keith Bovard:

kbovard@rrcity.com



AECOM

References

2004. Recommended Standards for Wastewater Facilities. Albany, NY: Wastewater Committee of the Great Lakes--Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers

