



Naval Support Activity Annapolis (NSAA) Water Reduction and Conservation

Andrew Hood, PE, Director of Engineering

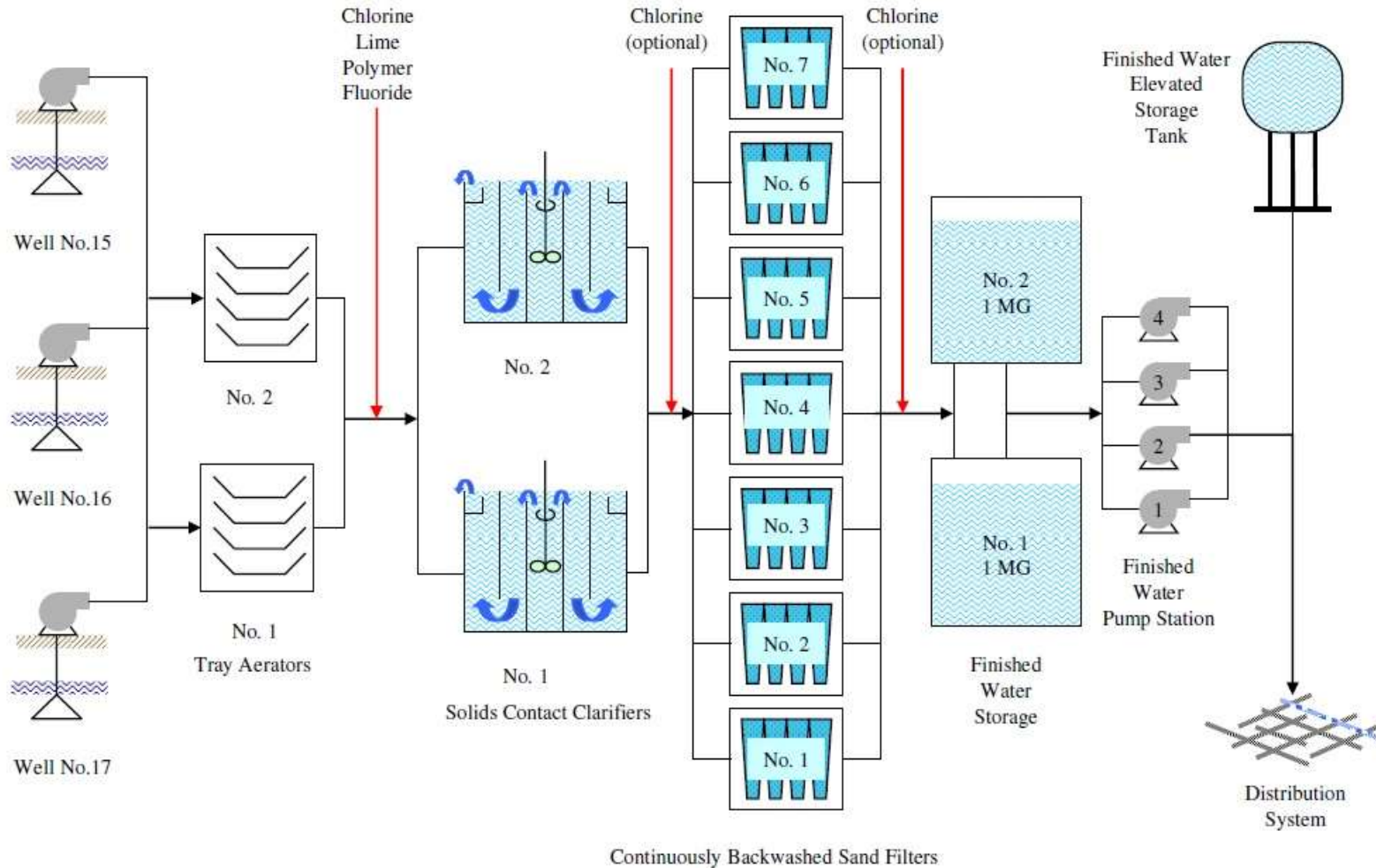


Water Reduction & Conservation Opportunity

- Plant design capacity of 2.3 Million Gallons per Day (MGD)
- One MGD potable water being supplied
- Potable water to the US Naval Academy
- Iron-oxide sludge with continuous backwash sand filters
- Sand filters backwash 380,000 gallons per day at design flow (up to 38% of total flow)
- Potential \$380,000 savings in discharge to sanitary sewer
- Potential \$220,000 savings in sludge disposal costs (7-9% Solids)



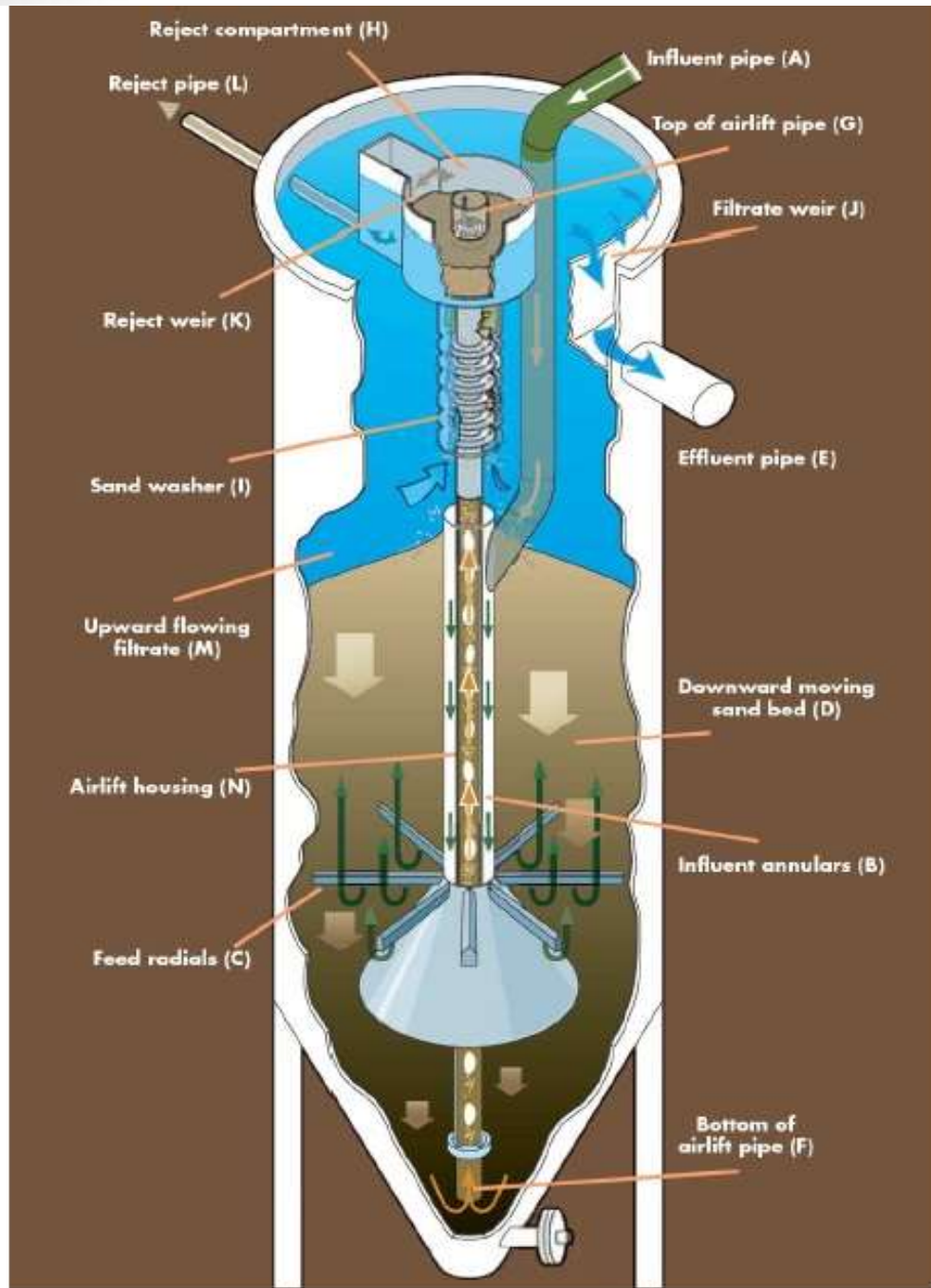
Existing Plant Flow Diagram



Site Overview



Sand Filters



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Project Timeline

- Plant study completed by AH Environmental in July 2008
- Original Request for Proposals late 2008
- JCC/Keystone submitted Proposal March 2009:
 - Sludge Holding Tank
 - Centrifuge
 - Conveyor and Sludge Dumpsters
- April 2009 JCC/Keystone presented to NSAA why we choose a centrifuge
- AECOM Completed Study in May 2011 with revisions:
 - Gravity Thickener Addition
 - Lamella Plate Settlers
 - Two (2) Centrifuges
 - Sludge Truck for Disposal
- New Request for Proposals Issued October 2011
- JCC/Keystone submitted new Proposal November 2011
- Contracted Awarded March 2013
- Project to be Completed June 2016



Request for Proposals - 2011

- Energy Conservation Measure type project
- Design-Build Project bid by Constellation Energy
- Project entailed sediment removal in the backwash and recycling the water as raw water



RFP Type

- Original (2009) proposal provided minimal information (performance based)
- RFP was the prescriptive type with design document references, 25% conceptual drawings, equipment performance information, previous project geotechnical report and general equipment specifications
- No contingency allowances were included in the proposal
- Deviation and value-engineering was not part of proposal process



Selection Process

Johnston Construction & Keystone Engineering

- Working together on previous DB projects is very beneficial.
 - Know each others roles and expectations
 - Trust has already been developed
 - Better opportunity to improve DB delivery based on past experience through completed projects
 - Demonstrating this experience is usually required in RFP and is typically assigned a relatively high scoring value
 - Working together on previous DBB projects is helpful experience also



Contractor/Engineer Team Development

- Due to our prior successful design build experience Johnston Construction Company and Keystone Engineering Group, were selected for the project
- Our past experience in design-build projects made team development a simple process
- JCC took the lead due to bonding requirements
- Communication procedures and assignments were identified at the project onset



Proposed Plant Flow Diagram

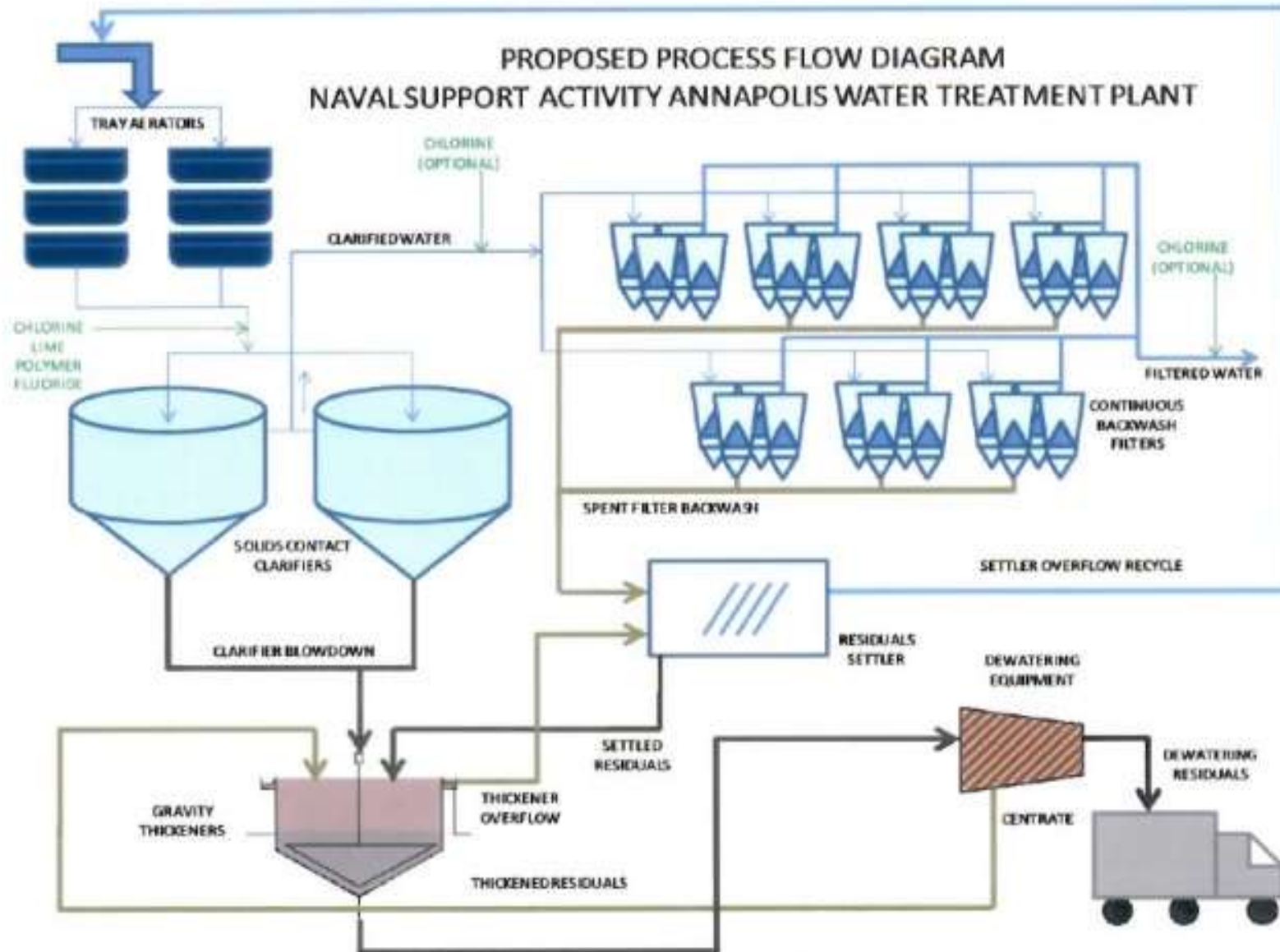


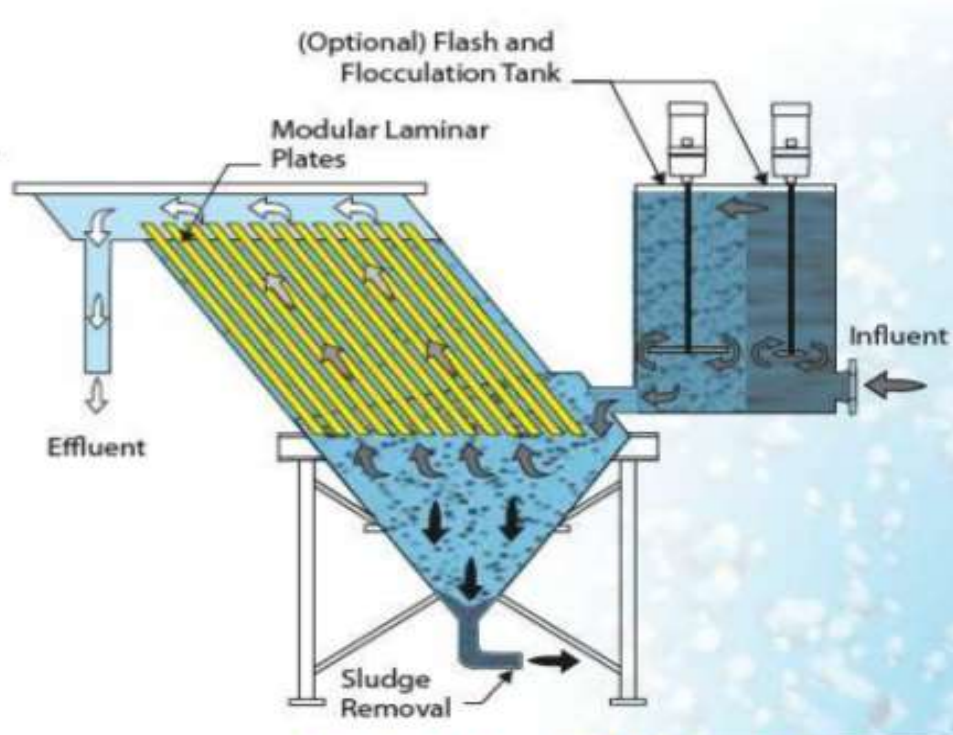
Figure 2 - Proposed NSAA WTP Process Flow Diagram

Timeline Photo



Residuals Settling

Sedimentation and flotation / Settling Zone



Vertical Parallel Plate Clarifiers

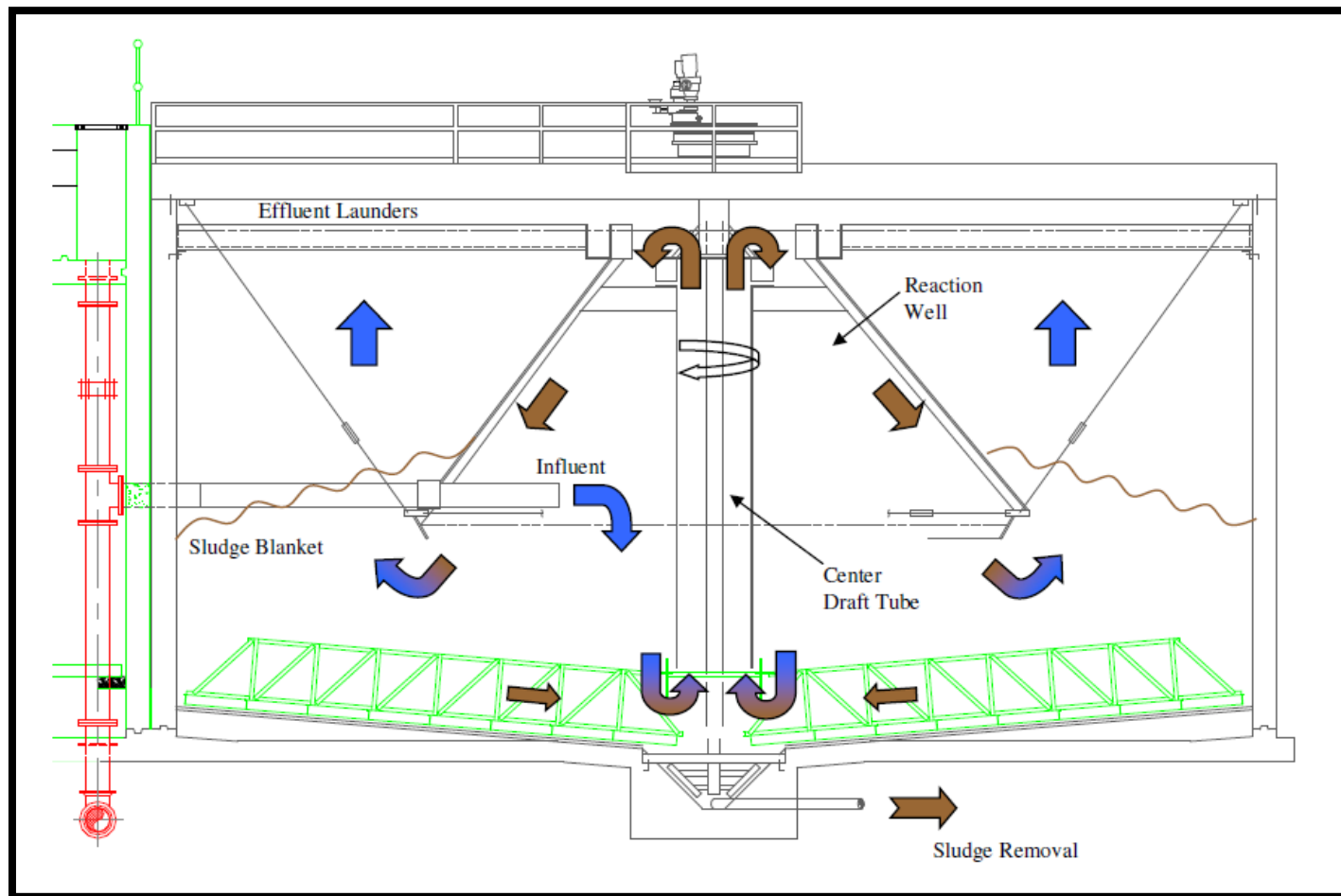


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Gravity Thickener

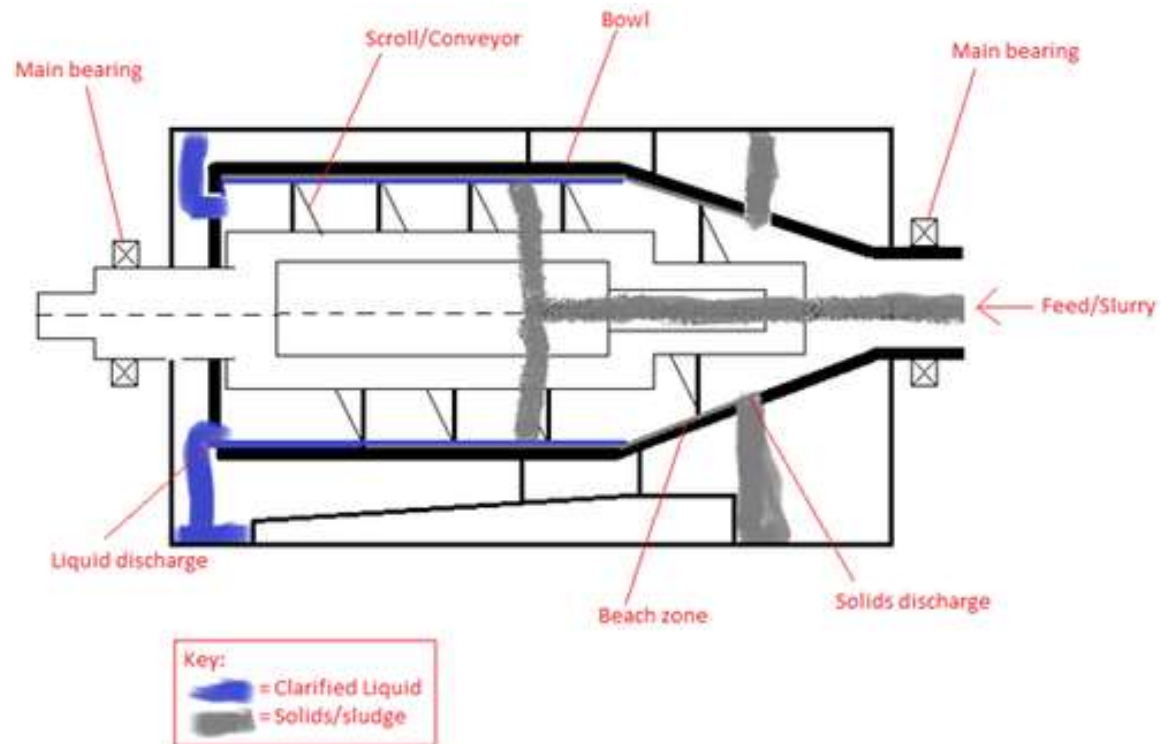


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Centrifuge



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Installed Lamella Clarifiers



Gravity Thickeners



GEA Centrifuges



Additional Improvements

- SCADA system upgrades
- New second generator for new electrical loads
- New VFDs and premium rated motors for three remote well pumps



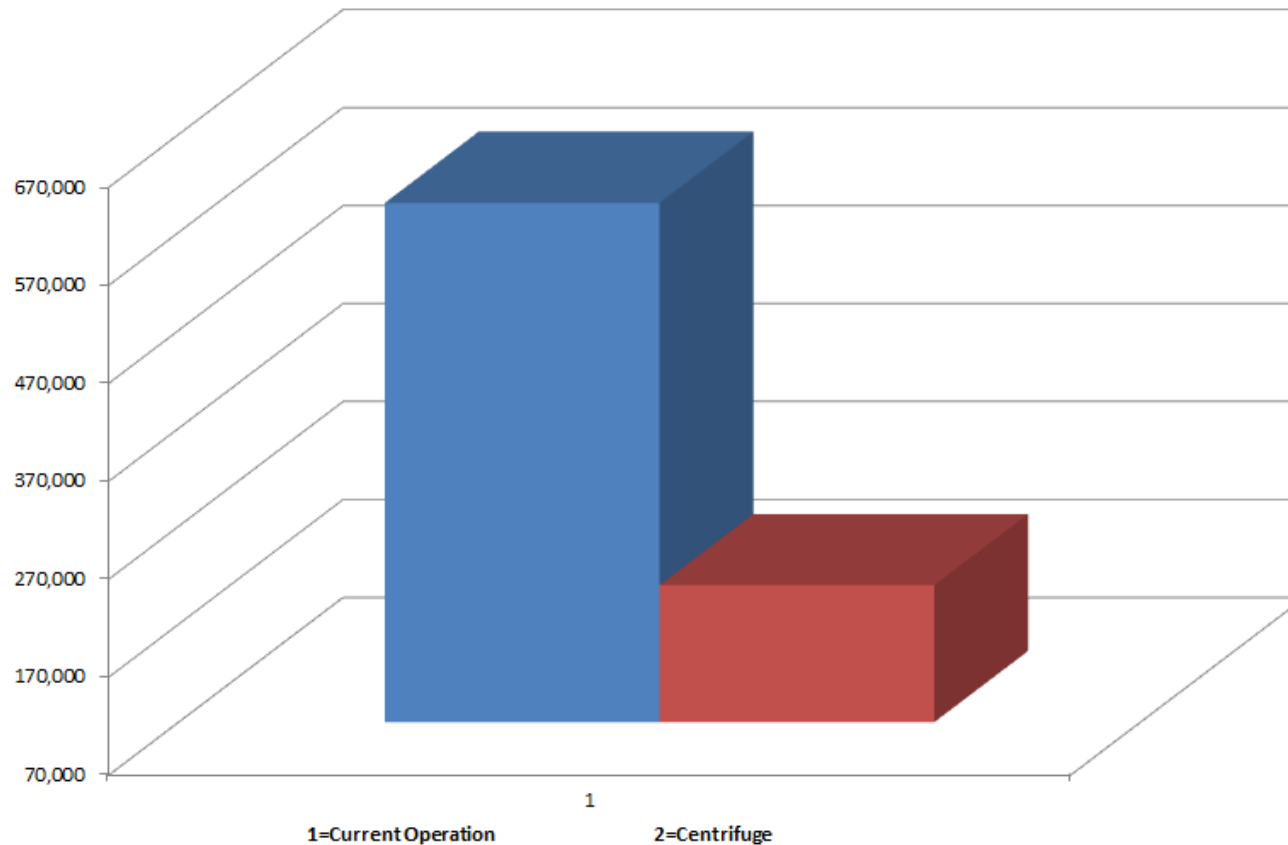
Initial Project Results

- Discharge to the sanitary sewer is 0 GPD now
- Percent solids has increased from 7-9% to 34-39% reducing disposal costs significantly



Projected Cost Savings

Estimated Annual Operating Costs



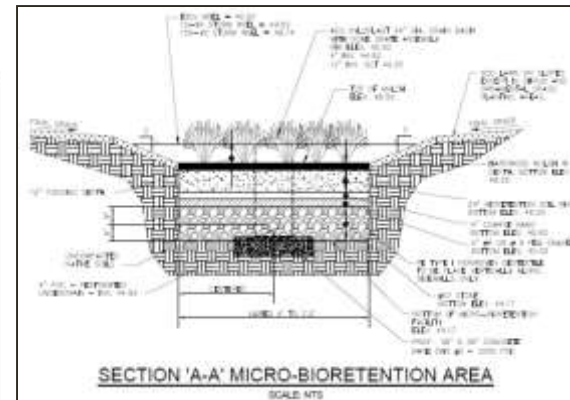
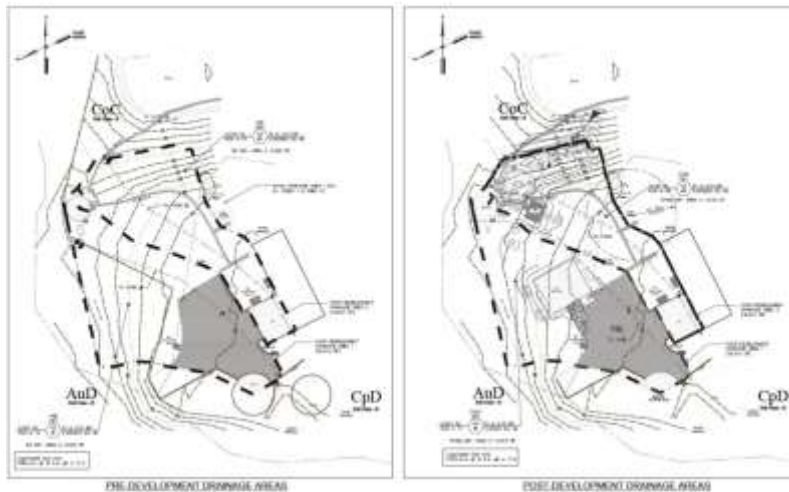
**EXPECT
DELAYS**

Permitting Phase

U.S. Naval Academy Water Treatment Plant



- New Federal guidelines required for full NSF compliance
- New MDE guidelines required all outdoor open top tanks to be covered
- Erosion and Sedimentation Control permitting delayed project
- All communication to the regulatory agencies was required to go through NAVFAC



Jar Testing

- Jar testing was completed to identify the best product for dewatering
- Anticipated percent solids much higher than anticipated



Lessons Learned

- Sludge Pump needs screening/grinding or macerator
- Agency regulations changes between bidding and contract award created challenges
- Direct contact between Design-Builder and Regulatory would have been beneficial
- Design engineer learned valuable lessons by managing the construction process
- Long lead projects can happen, 8-years from initial conception to project completion



Questions?

- Andrew C. Hood, PE, Director of Engineering

