RESOLUTION DIRECTING WORK TO KLEINFELDER FOR THE LTCP RIVER ROAD WWTP UPGRADES PROJECT

MOTIONED BY: Guzman
SECONDED BY: Friedrich

WHEREAS, the North Hudson Sewerage Authority (hereinafter "Authority") is a public body, duly formed under the Sewerage Authorities law, constituting Chapter 138 of the Laws of New Jersey of 1946, as amended (Chapter 14A of Title 40 of the New Jersey Statutes Annotated) and possesses the powers set forth therein; and

WHEREAS, Kleinfelder has been selected under resolution 22-127 to provide engineering services for various capital projects required throughout its service area that must be performed in order to maximize the performance of its waste water treatment facility, the capacity of its combined sewer system and/or to comply with its New Jersey Pollution Discharge Elimination System (NJPDES) permit; and

WHEREAS, Kleinfelder has submitted a proposal (Exhibit "A") to provide Basis of Design Engineering Services for the LTCP River Road WWTP Upgrades Project; and

WHEREAS, the Facilities Review Board has considered this request and proposal and recommends the approval of the full Board.

NOW THEREFORE, BE IT RESOLVED that the Authority, as recommended by the Facilities Review Board, directs Kleinfelder to provide Basis of Design Engineering Services for the LTCP River Road WWTP Upgrades Project not to exceed $393,820.00.

DATED: NOVEMBER 16, 2023

RECORD OF COMMISSIONERS' VOTE

	YES	NO	ABSENT
Commissioner Kappock	x		
Commissioner Marotta			x
Commissioner Gardiner	x		
Commissioner Friedrich	x		
Commissioner Guzman	x		
Commissioner Velazquez	x		
Commissioner Barrera	x		
Commissioner Zucconi	x		
Commissioner Assadourian			x

THIS IS TO CERTIFY THAT THIS RESOLUTION WAS DULY ADOPTED BY THE NORTH HUDSON BOARD OF COMMISSIONERS ON NOVEMBER 16, 2023.

_____
SECRETARY

KLEINFELDER
Bright People. Right Solutions.

NORTH SEWERAGE AUTHORITY HUDSON

Request for Proposals for Basis of Design Engineering Services for LTCP River Road Wastewater Treatment Plant Upgrades

Novemeber 2, 2023

November 2, 2023

Mr. Don Conger, PE, Authority Engineer
North Hudson Sewerage Authority
1600 Adams Street
Hoboken, NJ 07030

KLEINFELDER

RE: Basis of Design Engineering Services for LTCP River Road Wastewater Treatment Plant Upgrades

Kleinfelder is pleased to present our proposal to produce a Basis of Design Report for the River Road Wastewater Treatment Plant (WWTP) Upgrades Project as part of the Authority's ongoing Long-term Control Plan (LTCP) implementation. This project is critically important to the Authority as the LTCP-recommended alternatives require an increase in the wet-weather capacity of the River Road WWTP from 20 mgd to 35 mgd through various plant modifications and installation of a high-rate treatment system. It also provides the Authority the opportunity to perform a comprehensive upgrade to the plant to address long-term operations and performance.

Kleinfelder brings extensive experience from over 50 years of wastewater treatment engineering, assisting many of the largest CSO communities across the Northeast. We will take that experience and lessons learned to provide the Authority with a basis of design that is innovative, cost effective and provides for ease of operability. We invite you to refer to our Experience and Qualifications section as evidence of our success.

As demonstrated in our on-call services submission and specific to this project, we offer:

Experienced, Multi-disciplined Team: Kleinfelder has been in the wastewater engineering business for over 50 years, with expertise covering the planning, design, and construction of both new and upgraded or expanded treatment. **Notably, we have specific experience with the North Bergen Municipal Utilities Authority (NBMUA) in implementing a membrane treatment system for the direct filtration of trickling filter effluent. To our understanding, this is the only full-scale operation in the US where trickling filter effluent is applied directly to a high-rate filtering process for the removal of trickling filter solids.**

Knowledgeable, Fresh Perspective: Our extensive work in New Jersey and our experience helping similar communities across the Northeast has given us hands-on experience in developing innovative solutions to solve similar challenges that you face. **We are highly experienced with trickling filers and related systems through our work developing a phased wet-weather capacity expansion of the Lehigh County Authority's (LCA) Kline Island WWTP from 87 mgd to 130 mgd, which incorporates an innovate low-cost approach to increase capacity by temporary placing the tricking filters from a series mode of operation to a parallel mode of operation.**

Efficiency through our Experience: Kleinfelder has provided support on the implementation of Long-Term Control Plans to multiple clients throughout New Jersey and the Northeast and has the specific wastewater treatment experience required by the Authority on this project. **Our technical team will be led by Tim Bradley, PE as the lead technical engineer. Tim is a registered professional engineer in New Jersey, and has over 40 years' experience, leading innovative projects for similar communities within New Jersey. Tim was the technical lead on both the NBMUA filter project and LCA Kline Island expansion project and will leverage that experience on this project.**

We have continually achieved high-quality results for our clients under severe time constraints and have consistently met or exceeded our client's expectations. We are truly excited about this opportunity to partner with the Authority and welcome further discussions on our qualifications included herein.

Sincerely,

KLEINFELDER, INC.

Timothy Bradley, PE
Lead Technical Engineer
609.454.4555
TBradley@kleinfelder.com

Neil Kulikauskas, PE
Principal-in-Charge/Program Manager
860.258.7129
NKulikauskas@kleinfelder.com

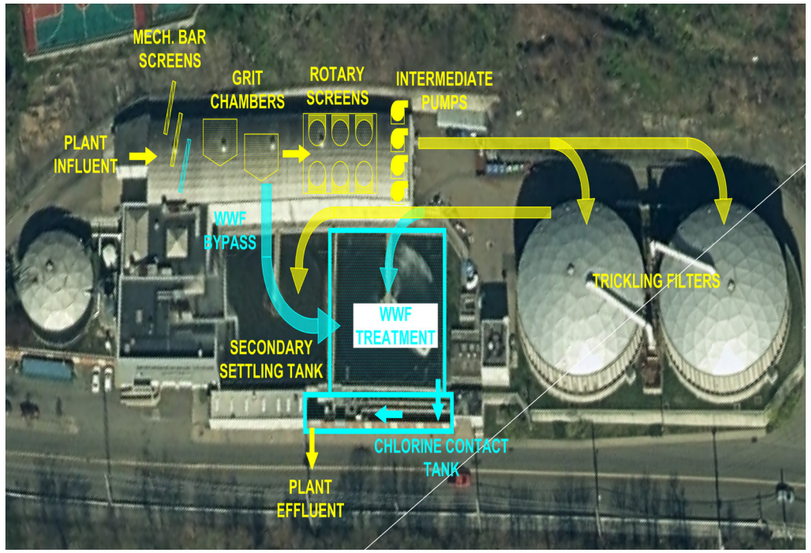
TABLE OF

CONTENTS

01 EXECUTIVE SUMMARY

Thorough Understanding of the Project

The success of the project will depend on the implementation of a high-rate treatment system that can reliably remove solids from the trickling filter effluent during dry and wet-weather flow periods and during periods with high snail and worm growth and biofilm sloughing without disruptions to the treatment process or permit compliance.



Our experienced, multi-disciplined team, has began studying the area and creating solutions to increase the wet weather capacity of the River Road WWTP.

WHY KLEINFELDER

- **Experienced, Multi-disciplined Team**
- **Knowledge, Fresh Perspective**
- **Efficiency through our Experience**

Leveraging our local Princeton staff and integrated, cross-disciplinary team of professionals situated in the Northeast, we will partner with the Authority to deliver best-in-class solutions that are creative and practical. Our reputation for expertise and innovation has solidified our position as a trusted consultant and leader in the wastewater industry.

The Right People to Provide Regional Experience Perfectly Tailored to the Authority

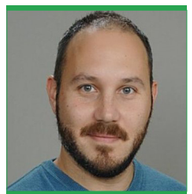
Our team brings hydraulic modeling, treatment methodology, construction in an urban environment, LSRP, and regulatory permitting; as well as local knowledge and understanding of the Authority, its infrastructure, and its challenges.

Tim Bradley, PE
Lead Technical Engineer

Mr. Bradley has over 42 years of wastewater and water engineering experience encompassing facility planning, design, permitting, financing, construction management, start-up, operations assistance, training, and process troubleshooting. Tim will bring his wealth of knowledge to the Authority on this project to ensure its success.

Neil Kulikauskas, PE
Principal-in-Charge

Felipe S. Contreras, PE, CME, CFM
Project Manager



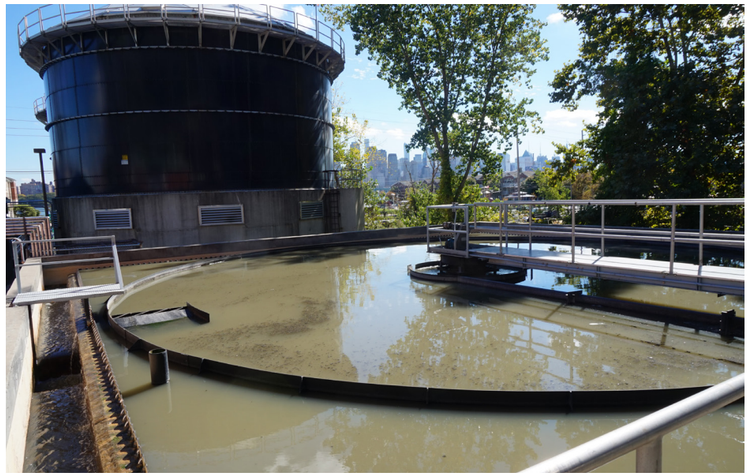
Mike Nexon, PE
Design Lead

Tushar Roy
Process and Hydraulics Lead

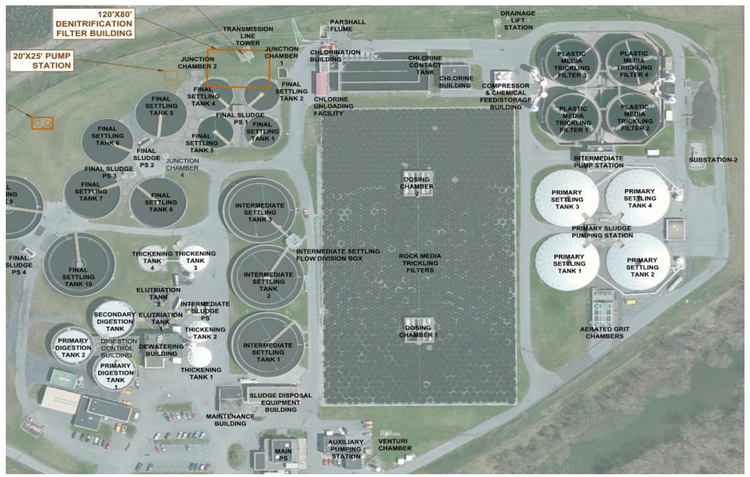
A Team Organized to Address All Treatment Methodology Elements

Our team has been carefully crafted to provide the technical experience needed to successfully establish a clear, implementable Basis of Design for the River Road Wastewater Treatment Plant Upgrades.

Experienced with Scope of Work and Challenges Presented



Kleinfelder gained invaluable experience working with North Bergen Municipal Utilities Authority implementing a membrane treatment system for the direct filtration of trickling filter effluent; inlcuding analysis of squircle clarifiers (shown above).



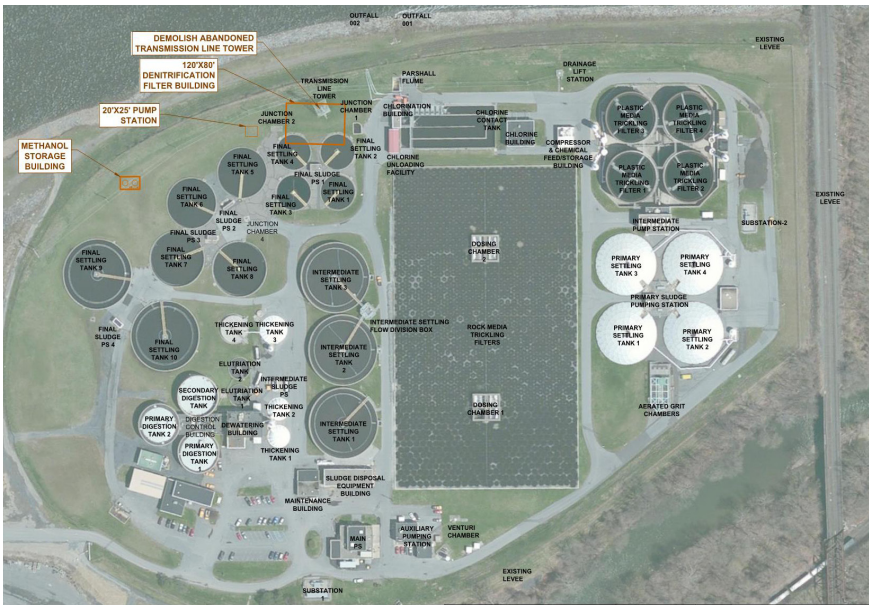
Kleinfelder is leading the development of a multi-phased program with Lehigh County Authority to expand the wet-weather capacity of the Kline Island WWTP.

02 PROJECT UNDERSTANDING

The overall objective of the River Road Wastewater Treatment Plant (WWTP) Upgrades Project is to increase the wet-weather treatment capacity of the River Road WWTP from 20 mgd to 35 mgd. This project is an essential element of the Auhtority's Long Term Control Plan (LTCP).

The River Road WWTP provides a secondary level of treatment utilizing a flow train consisting of influent screening with two mechanically-cleaned screens and one manually-cleaned screen, vortex grit removal, rotary screens for primary treatment, trickling filters with VFD driven rotary distributor help prevent excessive biofilm growth, two square secondary clarifiers with circular collector mechanisms, commonly referred to as "squircle" clarifies, sodium hypochlorite disinfection in a chlorine contact tank and a sodium bisulfite feed system to reduce the chlorine residual prior to the discharge of treated effluent to the Hudson River. Sludge generated by the treatment of wastewater is thickened and hauled off site for disposal. The piping configuration includes a bypass around the rotary screens that enables effluent from the girt removal system to be routed directly to the trickling filters. The River Road WWTP is on a tight site which limits the options available to expand peak wet-weather treatment capacity from 20 mgd to 35 mgd.

Kleinfelder is highly experienced with trickling filers and related systems through our work developing a phased wet-weather capacity expansion of the Lehigh County Authority's Kline Island WWTP from 87 mgd to 130 mgd, which incorporates an innovate low-cost approach to increase capacity by temporary placing the tricking filters from a series mode of operation to a parallel mode of operation.



Kleinfelder is leading the development of multi-phased program with Lehigh County Authority to expand the wet-weather capacity of the Kline Island WWTP.

The concepts for increasing the wet-weather capacity of the River Road WWTP as described in the RFP were established through the LTCP development process. The key elements of the conceptual plan are listed below.

1. Eliminate the two existing squircle secondary clarifiers and in their place construct a high-rate treatment system to (1) treat a peak flow of 35 mgd comprised of 15 mgd of screened and degritted influent flow blended with 20 mgd of trickling filter effluent, and (2) treat dry-weather flows comprised solely of trickling filter effluent to achieve reliable compliance with the River Road WWTP's effluent limits for BOD and TSS. **Kleinfelder has significant experience with the direct removal of trickling filter solids that have not been settled in a clarifier, and fully understands the challenges associated with snails and worms and sloughed biofilm and will apply this knowledge to the evaluation of high-rate treatment options.** Kleinfelder is also highly experienced with the recycle flows and loads and particle sizes from various high-rate treatment options and will apply this knowledge to the evaluation of options.
2. Increase the influent screening capacity from 20 mgd to 35 mgd, as further described in the Technical Approach.

3. Expansion of the existing chlorine contact tank to enable an increase in disinfection capacity to 35 mgd, together with potential capacity modifications to the sodium hypochlorite and sodium bisulfite storage and feed systems. As further described in the Technical Approach, Kleinfelder will evaluate three (3) options for increasing disinfection system capacity to 35 mgd at a lower cost than constructing a new chlorine contact tank or expansion of the existing chlorine contact tank.

4. Modification of the bypass piping system around the rotary screens to enable 15 mgd of grit system effluent to be routed to the high-rate treatment system. This pipe re-routing as well as other piping changes will require in-depth experience with hydraulic modeling, which Kleinfelder is deeply experienced in, through our work mitigating hydraulic impacts on multiple plant improvement projects.

The existing squircle clarifiers at the River Road WWTP, which will need to be demolished and replaced with the high-rate treatment system.

5. Construction sequencing to maintain operation throughout the construction period, a key element of which will be the demolition of one squircle clarifier followed by construction of the selected high-rate system in its place while concurrently enhancing the performance of the other squircle clarifier through chemical addition to settle trickling filter solids with only one clarifier in service. As further described in the technical approach, **Kleinfelder has proven experience with NJDEP in obtaining interim effluent limits during construction projects and will utilize it to assist the Authority in obtaining interim effluent limits if chemically enhancing settling in the one squircle clarifier in service is not sufficient to maintain reliable compliance with the current effluent limits during construction.**

6. Modification of the electrical distribution system and emergency generator as required to accommodate the additional electrical load.

7. Instrumentation and control modifications to enable clear and concise monitoring and control of the new treatment systems and equipment.

The services currently being procured will advance the design concepts described in the RFP to a Basis of Design level and will consist of the following:

- A comprehensive evaluation of at least five (5) high-rate treatment technologies which must include cloth media filters, compressed media filters, ballasted flocculation, and ceramic filters leading to a consensus recommendation of three (3) high-rate treatment technologies to be pilot-tested through a separate services procurement. These high-rate treatment technologies can be broadly characterized as high-rate settling and filtration technologies. As further descried in the Technical Approach, **Kleinfelder has significant experience with both types of high-rate technologies and fully understands their advantages and disadvantages in this specific application which requires the direct removal of trickling filter effluent solids, which includes snails, worms sloughed biofilm which can vary widely in TSS concentration.**

- Evaluation of options to increase the influent screening capacity to 35 mgd leading to a consensus basis of design recommendation for the number and type of screens.

- Evaluation of options to increase disinfection capacity to 35 mgd leading to a consensus basis of design recommendation for modifications to the existing chlorine contact tank (if any) and for modifications to the associated sodium hypochlorite and bisulfite storage and feed systems further described in the Technical Approach. Kleinfelder will evaluate three (3) options that have the potential to reduce cost and preserve space compared to a new chlorine contact tank or expanding the existing chlorine contact tank.
- Evaluation of the existing electrical distribution system and emergency generators to determine the current surplus capacity available to the plant upgrades and the modifications required if there is not sufficient capacity for the additional electrical loads.
- Development of a preliminary construction sequencing and maintenance of plant operation plan which will refine the details of the demolition of one clarifier for construction of the high-rate system while in parallel chemically enhancing settling in the second clarifier to optimize performance during settling. The Authority will need to know prior to construction, the effectiveness of one clarifier in service with chemical enhancement.
- Preparation of preliminary layouts and Class 4 cost estimates. **Kleinfelder will develop a plan for full-scale testing to assess the reliable performance with one clarifier in service, and if necessary, based on the level of performance obtained, assist the Authority in discussions with NJDEP regarding interim effluent limits during construction.**

The services briefly described above are expanded upon in the Scope of Services, which is fully consistent with the RFP.

In summary, the key to a successful project is the selection of a high-rate technology that consistently and reliably achieves compliance with effluent limits when treating trickling filter effluent that has not first been clarified, and which performs successfully during intermittent peak flows of 35 mgd without excessive operator intervention or maintenance requirements. As further described in the Technical Approach, **Kleinfelder's experience with the widely varying characteristics of trickling filter effluent will help ensure a successful project.**

> "Kleinfelder has been providing on-call wastewater engineering services to the City since 2005, performing a multitude of services across the entire system including planning studies, detailed design, and construction administration.
>
> They have brought great technical experience, competence, and enthusiasm to our projects. Their work has included the development of a comprehensive facility plan and a capital improvement plan at the treatment plant to prioritize repairs and upgrades. They have also designed and managed over $100 million in capital projects at the plant to date. For the collection system, they have upgraded pump stations, performed detailed I/I studies and SSES investigations, led us through CMOM requirements and completed a number of projects to repair and upgrade the system. "
>
> RICARDO MORALES, COMMISSIONER OF PUBLIC SERVICE AND UTILITIES
> CITY OF PITTSFIELD, MA

03 TECHNICAL APPROACH

Kleinfelder's Technical Approach to this project is based on our unique understanding of the challenges in utilizing high-rate treatment technologies for the direct filtration of trickling filter effluent (without clarification prior to filtration) gained through our work assisting the North Bergen Municipal Utilities Authority (NBMUA) in implementing a membrane treatment system for the direct filtration of trickling filter effluent. **It is our understanding that this is the only full-scale operation in the US where trickling filter effluent is applied directly to a high-rate filtering process for the removal of trickling filter solids.**

Because direct filtration of trickling filter effluent or direct removal of trickling solids from high-rate enhanced settling processes are not common, the evaluation of alternative high-rate processes will need to be based largely on the consulting engineer's judgement, rather than experience, and with information provided by the high-rate system manufacturers; none of which currently have operating systems treating trickling filter effluent which has not been clarified.

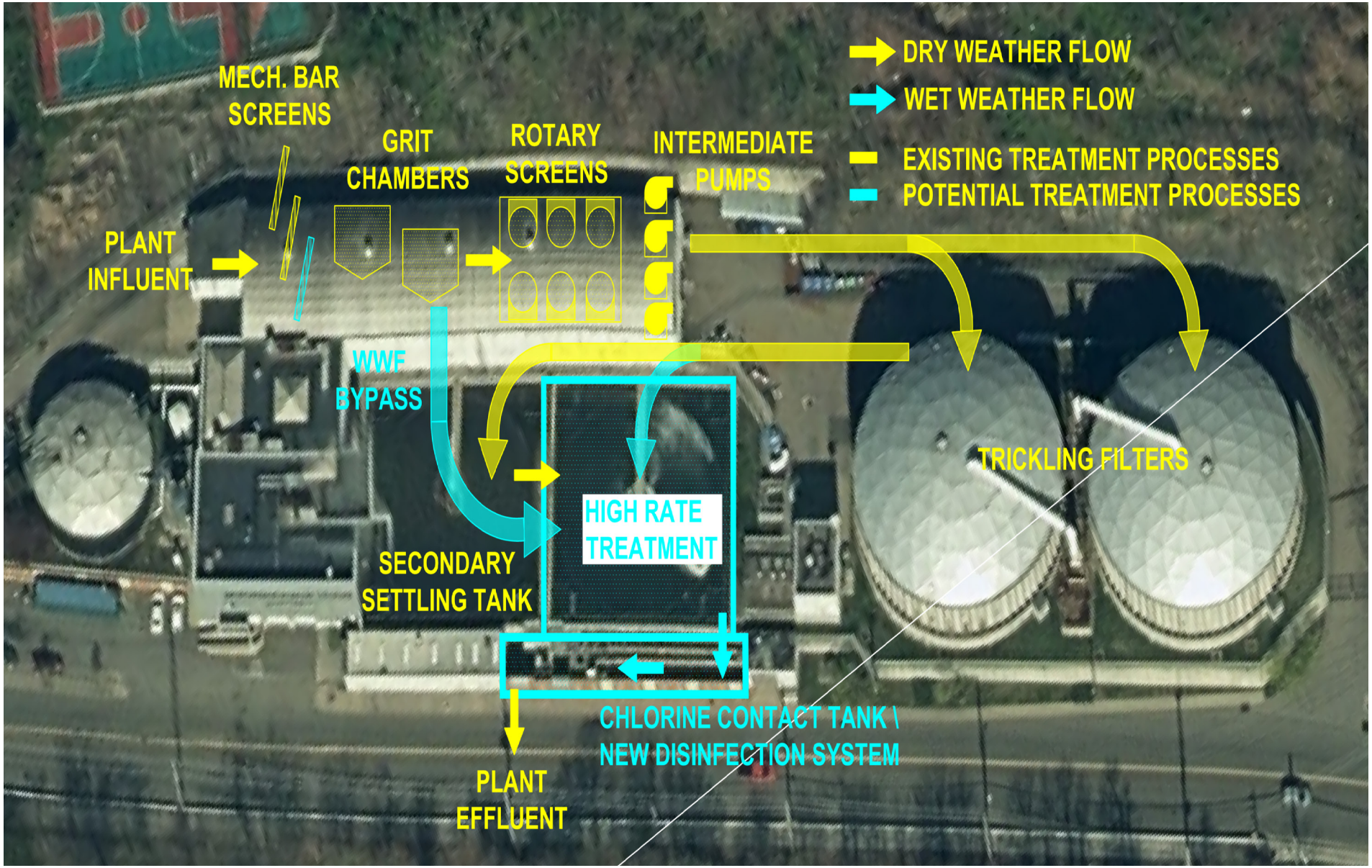
The success of the River Road project will depend on the implementation of a high-rate treatment system that can reliably remove solids from the trickling filter effluent during dry and wet-weather flow periods and during periods with high snail and worm growth and biofilm sloughing without disruptions to the treatment process or permit compliance. Snails, worms and biofilm sloughing can result in wide fluctuations in TSS concentrations which can adversely impact high-rate treatment systems and may require pretreatment systems to prevent adverse impacts.

However, Kleinfelder will utilize the lessons learned from the NBMUA project together with the standard evaluation criteria of space requirements, capital cost, chemical requirements and cost, electrical loads and cost, operational complexity, and maintenance requirements, to evaluate six (6) high-rate treatment processes. The lessons learned from the NBMUA project will be of significant value in evaluating each option; particularly in how they relate to the significant seasonal variability in snail and worm growth and the sloughing of biofilm that can occur during peak flow and during filter slushing. It is critical to prevent excessive biofilm accumulation which occurs by temporarily increasing the flow rate to the trickling filter media, for example by temporarily slowing the rotational speed of the rotary distributor.

Filtering and High-Rate Settling

The six (6) high-rate treatment processes that Kleinfelder will evaluate are the four (4) required by the RFP (cloth media disc filters, compressed media filters, ballasted flocculation (Actiflo) and ceramic filters) plus two (2) additional options: ballasted flocculation (Comag) and dissolved air flotation. As a result, three (3) filtering options and three (3) high-rate settling options will be separately evaluated.

- The advantages of high-rate settling options are that they do not generate a significant recycle flow and do not generate recycle of fine particles which are difficult to settle and remove from the plant and which can build-up in the system and adversely impact performance.
- The disadvantages are that they generally require a higher level of chemical treatment and may require pretreatment to avoid clogging of the equipment that separates the ballast for reuse.



Conceptual Aerial Site Plan: Proposed modifications to River Road WWTP for evaluation of LTCP flow upgrades. Considerations for addition of third mechanical screen, new high-rate treatment facility located within footprint of northern secondary settling tank, wet-weather bypass, and higher capacity disinfection system.

There are, of course, some unique advantages and disadvantages for the three individual high-rate filtering options. The three filtering options share the advantage that they can achieve a higher level of TSS removal than a high rate settling option, and they all have the disadvantages that they generate a recycle flow which includes fine particles that can be difficult to remove within the plant. Each of the individual filtering options also has its own unique advantages. For example, the ceramic filter has a pore size small enough to physically remove fecal coliform organisms which could preclude the need for chemical disinfection. However, it requires pretreatment to 500 microns, significant chemical cleaning, and produces significant backwash water which contains small particles which can be difficult to remove from the plant. Also, because this option will remove essentially all TSS, it will likely have the greatest impact on the existing solids handling system.

Kleinfelder gained invaluable experience working with NBMUA implementing a membrane treatment system for the direct filtration of trickling filter effluent; inlcuding analysis of squircle clarifiers (shown above).

Kleinfelder has experience with each of these options. Examples include:

- Design of six disc-filter installations in NJ, including a 19-mgd disc filter facility for the Stony Brook Regional Sewerage Authority.
- Evaluation of alternatives and design of a 14-mgd compressible media filter system as a key component of an SSO treatment system for the Somerset Raritan Valley Sewerage Authority.
- Detailed wet-weather treatment alternatives evaluations for DELCORA considering Bio-actiflo, compressible media filters, and a hydraulically induced solids separation system.
- Pilot-testing of ballasted flocculation technologies for Pittsfield, MA followed by design of a 40-mgd Comag tertiary treatment facility.
- Participated in the design of the NBMUA project which is a membrane filtration system for the direct filtration of trickling filter effluent which is directly relevant to the Ceramic Filter option. Note that due to some manufacturer deficiencies in the membrane pretreatment system, pilot testing of two alternative membrane pretreatment systems has been arranged and will be initiated within the next few weeks.

Increase to Disinfection Capacity

Kleinfelder will evaluate the followings options to increase disinfection capacity to 35 mgd. The first is to expand the existing chlorine contact tank using conventional sizing criteria together with capacity modifications to the sodium hypochlorite and sodium bisulfite storage and feed systems. The following options are all intended to reduce costs and preserve space. The first cost-saving alternative is to minimize the volume of the chlorine tank using the contact-time (CT) approach recognized by the Environmental Protection Agency and as presented in Water Environment Federation publications. In this approach a higher sodium hypochlorite dose reduces the contact time required for the desired log reduction of fecal coliform or another indicator organism. **Kleinfelder utilized this approach as part of a plant expansion design for DELCORA and have recommended it in a concept design for increasing the wet-weather treatment capacity of the 40-mgd Kline's Island Wastewater Treatment Plant in Allentown, PA.** We do not anticipate any problems with NJDEP in issuing a Treatment Works Approval with this approach to sizing a chlorine contact tank. In this approach, Kleinfelder will evaluate the optimized chlorine contact tank size considering the corresponding chemical storage volume requirements for sodium hypochlorite and sodium bisulfite.

As an additional cost-saving option for disinfection, and subject to verification through pilot testing, the ceramic membrane option for high-rate treatment will likely provide sufficient physical removal of fecal coliform organisms to preclude the need for chemical disinfection. This option is likely feasible based on Kleinfelder's successfully obtaining NJDEP permits for physical disinfection at two membrane reactors in New Jersey.

The third option to reduce costs and preserve space is to implement UV disinfection within the existing chlorine contact tank. Kleinfelder has successfully implemented UV disinfection in existing chlorine contact tanks for the Stony Brook Regional Sewerage Authority for a peak flow capacity of 60 mgd and at the Ewing-Lawrence Sewerage Authority for a peak flow capacity of 56 mgd.

Hydraulics

To ensure adequate hydraulic conveyance capacity for the 15 mgd of peak flow from the grit system effluent to the high-rate system and the 20 mgd of trickling filter effluent to the high-rate system, and the conveyance of 35 mgd through the high-rate system and then to the disinfection system, Kleinfelder will utilize hydraulic modeling to size new piping and to establish key elevations related to construction of the high-rate system.

Influent Screening

Regarding the increase in influent screening capacity, Kleinfelder will utilize its experience in evaluating options and subsequently designing a new headworks facility with 60-mgd peak flow capacity for Stony Brook Regional Sewerage Authority and for a new 56-mgd peak flow headworks facility for the Ewing Lawrence Sewerage Authority. We will evaluate options and corresponding costs to increase the peak flow capacity of the existing screening system, which include installation of a mechanically-cleaned screen to replace the manually-cleaned screen, or to replace the two existing mechanically-cleaned screens with higher capacity screens while continuing to have a standby manually-cleaned screen. Consideration will also be given to replacing the screens with finer screens based on the pretreatment requirements of the three short-listed high-rate treatment technologies.

Kleinfelder's technical approach as presented above is the basis for our Scope of Work which follows.

Kleinfelder will evaluate multiple options for increasing the capacity of the existing influent screening system to 35 mgd. We will utilize experience designing new headworks facilities for increased capacities at Stony Brook Regional Sewerage Authority (60 mgd) and Ewing Lawrence Sewerage Authority (56 mgd).

04 SCOPE OF WORK

The scope of work presented below will produce a Basis of Design Report for the LTCP River Road WWTP Upgrades Project that will serve as a guide for the improvements to be designed and constructed to increase the wet-weather capacity of the River Road WWTP from 20 mgd to 35 mgd.

The Basis of Design Report will present the conceptual designs for three consensus high-rate technologies to be pilot-tested through a subsequent procurement as well as pilot testing plans for each technology. It will also present the consensus basis of design for influent screening modifications, disinfection system modifications, solids handling system modifications and related plant infrastructure modifications including, hydraulic conveyance improvements, electrical system improvements, instrumentation and control system improvements, structure modifications and new structures. Conceptual layout drawings and Class 4 Capital cost estimates will also be presented in the Basis of Design Report, as well as a construction sequencing plan, project implementation schedule and a listing of permits that will be required for construction.

The tasks that will be performed to produce the Basis of Design Report have been arranged into the three main Tasks below which are consistent with the RFP.

- Task 1 – Information Gathering and Site Assessment
- Task 2 – Treatment Technology Selection
- Task 3 – Basis of Design Report

The work activities and deliverables for each task are detailed below.

Task 1 – Information Gathering and Site Assessment

The six (6) high-rate treatment processes that Kleinfelder will evaluate are the four (4) required by the RFP (cloth media disc filters, compressed media filters, ballasted flocculation (Actiflo) and ceramic filters) plus two (2) additional options: ballasted flocculation (Comag) and dissolved air flotation. As a result, three (3) filtering options and three (3) high-rate settling options will be separately evaluated.

1.1 Kickoff Meeting

Kleinfelder will conduct a kickoff meeting at the Adams Street WWTP followed by a site visit to the River Road WWTP where it will conduct interviews with the Authority Engineers and Operations Management.

1.2 Evaluation and Analysis of Existing Conditions

We will evaluate existing conditions through a site visit and review of as-built drawings as well as all documentation regarding the proposed River Road Upgrades. Documents include the NHSA Long Term Control Plan, the record drawings for the River Road WWTP, and the plant model. Based on the existing conditions, we will confirm and establish the design criteria for the plant upgrades.

Our team will work closely with Authority personnel, both the managerial and operations staff, to gain their insight into any issues they may have with existing facilities. Our experience has found that learning from the operations staff as to what works best for them provides important insight to how we approach the work.

1.3 Site Visit

Perform a site visit of the plant and document critical locations with photographs and field measurements. These photographs will be included in the final report with appropriate captions.

1.4 Site Survey

The Kleinfelder team will perform a topographic survey sufficient to locate all above grade features as well as below grade piping, chemical feed lines, electrical ducts, and other utilities. It is understood that the site is highly constrained, and the survey must be adequate to assess the placement of new equipment, reconfiguration of existing conditions, available space for working and maintenance, and sequencing of the project to maintain plant operations. The topographic survey will focus on the area in and around the secondary clarifiers.

Task 2 – Treatment Technology Selection

2.1 Mechanical Bar Screen

As described in the Technical Approach, Kleinfelder will evaluate following options for increasing the capacity of the influent screening system to 35 mgd: installation of a mechanically-cleaned screen to replace the manually-cleaned screen, resulting in a total of three mechanically-cleaned screens, and replacement of the two existing mechanically-cleaned screens with higher capacity screens while continuing to have a standby manually-cleaned screen. The evaluation of alternatives will consider influent piping configuration, modifications to the screening building and handling of material removed from the wastewater. Consideration will also be given to replacing the screens with finer screens based on the pretreatment requirements of the three short-listed high-rate treatment technologies.

2.2 High-Rate Treatment

As described in the Technical Approach, Kleinfelder will evaluate the six (6) high-rate treatment technologies consisting of the three (3) filtering technologies and three (3) high-rate clarification technologies listed below.

- Cloth Media Filters
- Comprised Media Filters
- Ceramic Filters
- Ballasted flocculation - Actiflo
- Ballasted flocculation - Comag
- Dissolved Air Flotation

The evaluation of these alternatives will result in a consensus recommendation to pilot test three (3) of the technologies through a separate procurement that follows development of the Basis of Design Report.

Evaluation criteria for the six (6) high-rate treatment technologies will consist of the following:

- Prior experience treating trickling filter effluent that has not been clarified.
- Anticipated removal efficiency and effluent concentrations for BOD and TSS.
- Anticipated TSS influent concentration and particle size limits to avoid pretreatment – it is assumed that the Authority will provide analytical data on the TSS variability of grit system effluent during wet weather flows, and the TSS variability in trickling filter effluent during dry and wet-weather flows to compare to the limits related to the need for pretreatment.
- If anticipated to be required, the type, physical size, available space, and cost of the anticipated pretreatment system.
- The anticipated recycle flow, if any, and the resulting impact on in-plant hydraulic conveyance capacity requirements.
- The anticipated recycle flow TSS concentration and particle size distribution and the resulting impact on the solids handling system capacity and whether the /particle size may be too small to be removed by the rotary screens without coagulation, and if anticipated to be required, the space requirements and costs for a coagulant storage and feed system.

- The connected and operating electrical load for the high-rate rate treatment system and the corresponding impacts to the existing electrical distribution system and emergency generator.
- The anticipated chemical requirements for the high-rate treatment system.
- The anticipated increase in sludge production.
- The space requirements for the high-rate treatment technology including, as applicable, all chemical storage and feed systems, ballast storage and feed system, pretreatment systems and all other support systems including the need for buildings to house portions of the system, etc.
- Whether the high-rate system can fit within the space currently occupied by one squircle clarifiers.
- The Class 4 capital cost estimate for the high-rate technology including all required support facilities.
- The annual O&M cost for chemicals, ballast electricity and for the increase in sludge production and disposal costs.

Snails, worms and biofilm sloughing from the existing trickling filters at the River Road WWTP can result in wide fluctuations in TSS concentrations which can adversely impact high-rate treatment systems.

- The availability of a pilot-testing system from the high-rate treatment system manufacturer, and if pretreatment is required, the availability of a pretreatment system to be included and the overall physical size of the high-rate pilot unit together with its pretreatment system.

In performing the evaluation of high-rate treatment alternatives, Kleinfelder will utilize the site survey to perform an analysis of the area occupied by the secondary clarifiers and will investigate potential configurations of the high-rate treatment technology taking into consideration the existing facilities and required capacity of 15 mgd of additional wet-weather flow and a total peak flow of 35 mgd.

2.3 Chlorine Contact Tank

As described in the Technical Approach, Kleinfelder will evaluate expansion of the chlorine contact tank together with potential increases in capacities of the sodium hypochlorite and sodium bisulfite storage and feed systems as described in the RFP, and we will also evaluate three (3) alternatives to reduce disinfection system costs and to preserve space.

The first cost-saving alternative is to reduce the volume of the chlorine tank using the CT approach recognized by the Environmental Protection Agency and as presented in Water Environment Federation publications. In this approach a higher sodium hypochlorite dose reduces the contact time required for the desired log reduction of fecal coliform or another indicator organism. In this approach, Kleinfelder will evaluate the optimized chlorine contact tank size considering the corresponding chemical storage volume requirements for sodium hypochlorite and sodium bisulphite his option will eliminate the need for expansion of the chlorine contact tank.

The second cost and space-saving alternative to increase disinfection system capacity to 35 mgd is the ceramic filter option for high-rate treatment, which, subject to verification though pilot testing, has a pore size sufficient to remove fecal coliform organisms without the need for chemical disinfection. This option is likely feasible based on Kleinfelder's successfully obtaining NJDEP permits for physical disinfection at two membrane bioreactors in NJ with similar pore sizes.

The third option to reduce costs and preserve space is to implement UV disinfection within the existing chlorine contact tank. As noted in the Technical Approach, Kleinfelder has successfully implemented UV disinfection in existing chlorine contact tanks at similar size facilities. To evaluate this option for the River Road WWTP, Kleinfelder will perform the following activities:

- Collect samples of secondary clarifier effluent, which is anticipated to be of similar quality to the effluent quality produced by any of the high-rate treatment options being considered and ship to Trojan Technologies for UV Transmissivity testing and collimated beam testing. This testing will be essential to evaluate the UV dose required to reliably achieve disinfection.
- Based on the physical size of the UV system, Kleinfelder will evaluate if the system can be retrofitted into the chlorine contact tank which is common.
- Each of the disinfection alternatives will be compared on the basis of amortized capital costs (assuming New Jersey Water funding), plus the annual costs of chemicals, electricity and lamp replacement costs other considerations will be compared to the value of preserving space and the value of reducing truck traffic for chemical deliveries.

2.4 Piping and Instrumentation Diagram

Kleinfelder will prepare a Piping and Instrumentation Diagram that details how the proposed screening facility, the high-rate treatment system and the modified disinfection system will interact with the normal operation of the River Road WWTP and the other improvements that are proposed at the treatment facility under the Authority's LTCP.

2.5 Electrical Load Evaluation

As part of the previously scribed alternatives evaluation, the Kleinfelder Team will evaluate the existing electrical distribution system including the generator and determine if adequate capacity is available for the proposed facilities, and if not, the modifications that will be required.

2.6 Footprint and Layout

Also, as part of the previously described alternatives evaluations, Kleinfelder will prepare conceptual layouts and site plans (10% Design) based upon the available space to construct the proposed improvements to the River Road WWTP. Layouts will be based upon each of the three recommended high-rate treatment technologies. Kleinfelder will also investigate and propose, if necessary, upgrades to the electrical facilities, including the generator, and determine where within the existing facilities the required equipment can be located. The layout will include basic dimensions including depth, length, and width. The layout will also include recommendations for what existing infrastructure may require relocation within the River Road WWTP.

Kleinfelder will also examine the need for potential upgrades to the River Road WWTP headworks that may be required by this program.

Additional activities that will be performed in concert with the alternative's evaluations are described in the following sections.

2.7 Construction Sequencing / Maintenance of Plant Operations

Kleinfelder will prepare a sequencing plan with layouts and sketches indicating how plant operation can be maintained during construction. As part of this plan, Kleinfelder will consider measures to increase the capacity of the existing clarifier to be kept in service during construction, including but not limited to: Chemical and temporary portable treatment units.

2.8 Pilot Study Formulation

Kleinfelder will coordinate with each of the high-rate technology suppliers to determine their requirements for a pilot study to evaluate the effectiveness of their technology, including required pre-treatment systems, as applicable. The following will be established for each technology provider, In addition, Kleinfelder will review each manufacturer's standard pilot-testing agreement to ensure that the owner requirements are known:

In Pittsfield, Kleinfelder led the pilot-testing for ballasted flocculation technologies including Actiflo and Comag, which eventually led to a new 40-mgd Comag tertary treatment system.

- Duration of study
- Pilot rental costs
- Cost for transporting he pilot unit to and from the River Road
- Cost for or manufacturer representative to assist in operating the pilot system
- Footprint requirements
- Power requirements
- Chemical requirements

2.9 Regulatory Permits

Kleinfelder will prepare a list of the anticipated permits and related fees for construction of the project, such as the NJDEP Treatment Works Approval.

2.10 Cost Estimate

A Class 4 Engineers cost estimate will be performed based on the results of the above tasks. This cost estimate will be summarized in the Basis of Design Report which will be prepared in Task 3.

Task 3 – Basis of Design

Kleinfelder will develop a Basis of Design Report (BODR) and cost analyses for the LTCP River Road WWTP Upgrades project. The final BODR will be used as a foundation for the final project design. It is noted that because pilot-testing will be performed following completion of the Basis of Design Report, and the pilot study may result in the need to modify the high-rate treatment technologies, the BODR may need to be revised following the pilot-testing program, as a minimum to document the selected high-rate treatment system following pilot testing.

3.1 Report Contents

The report will include but not be limited to the following:

- Title page
- Table of contents
- Executive summary
- Site photographs
- Conceptual site plan of the mechanical bar racks, flow bypass, high-rate treatment technologies, disinfection and other associated facilities
- Listing of permits
- Class 4 cost estimate

Kleinfelder works closely with our clients and our experience translates into benefits that include cost-saving alternatives and timely, innovative approaches to solving challenging problems.

A teleconference will be held with the Authority to review comments on the above deliverables. Comments will be incorporated into the Final BODR which will then be submitted to the Authority.

3.2 River Road LTCP Improvements

Kleinfelder will develop design concepts and overview drawings that show at a minimum:

- Proposed footprint for each of the recommended technologies.
- P&ID diagram.
- Analysis of options and recommendations.
- Analysis of the River Road WWTP upgrades to treat an additional 15 mgd of wet-weather flow and a total peak flow of 35 mgd utilizing a high-rate treatment system.
- Location and layout of the three (3) selected high-rate treatment technologies for pilot-testing and related pretreatment systems, if required.

Kleinfelder will also provide construction sequencing recommendations to maintain full plant operation during construction.

3.3 Project Timeline/Schedule

Kleinfelder will develop an anticipated project schedule for design, permitting and construction of the entire project considering the schedule requirements of the LTCP as documented in the Authority's permit, including anticipated equipment lead times.

A teleconference will be held with the Authority to review comments on the above deliverables. Comments will be incorporated into the Final BODR which will then be submitted to the Authority.

3.4 Meetings

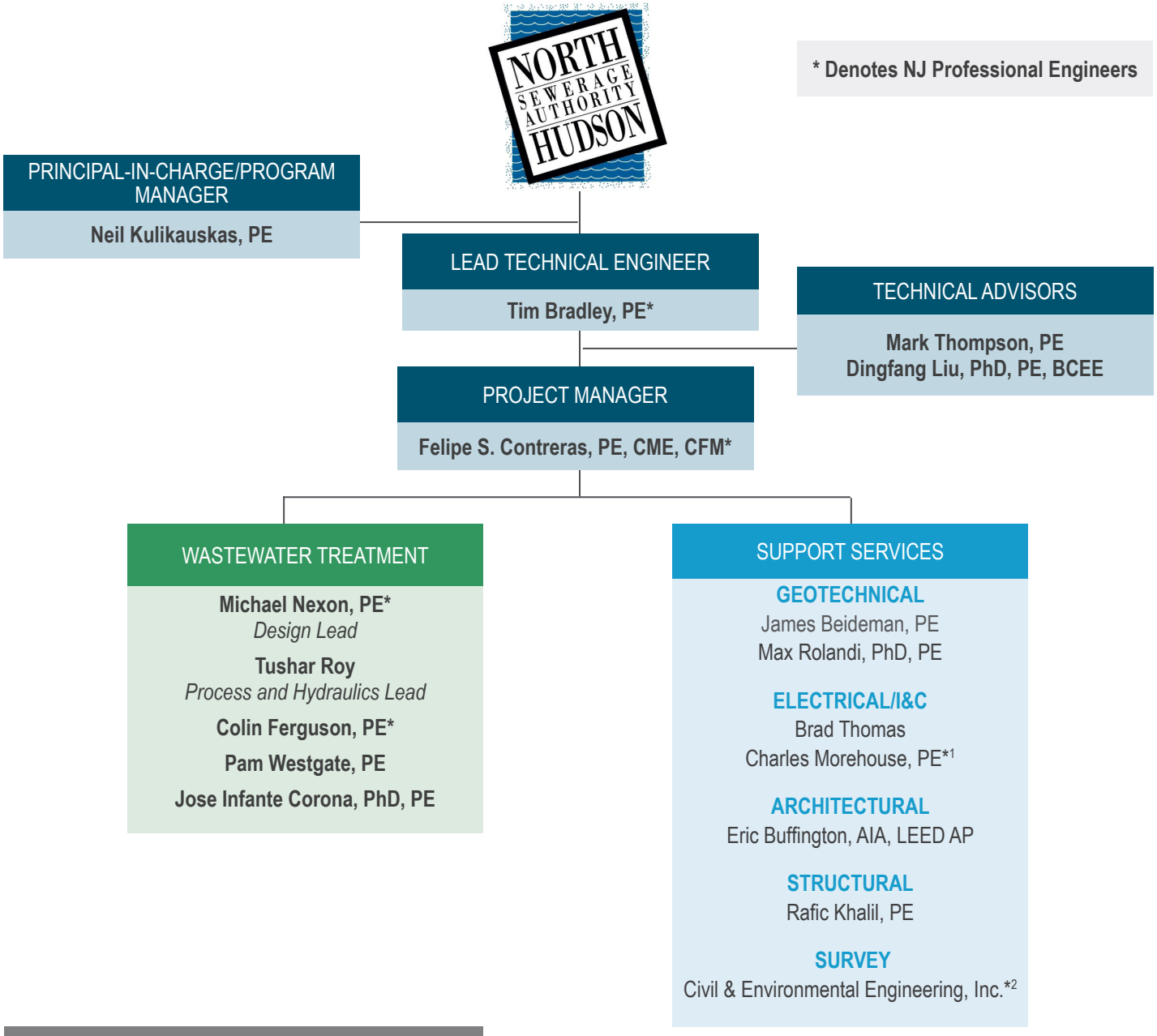
Kleinfelder will meet with the Authority staff monthly for the duration of this project and shall prepare minutes or meeting notes for each meeting. The Kleinfelder will submit a project schedule for deliverables coordinated with monthly meetings. Kleinfelder will schedule a two-week period for review and approval of draft deliverables.

We have designated Felipe S. Contreras, PE, CME, CFM as the Professional Engineer licensed in the State of New Jersey to act as the Project Manager and to provide direction to the design team during the project. Felipe as Project Manager will be responsible for budgets, coordination and communication with the Authority and design team over the duration of the project.

> "Kleinfelder has assisted and represented the Rockaway Valley Regional Sewerage (RVRSA) for more than 10-years with permitting, technical evaluations, design/ construction management and legal tasks. Kleinfelder's representatives are professional, experienced in all aspects of wastewater treatment and conveyance, and are extremely dedicated to the needs of their clients. I highly recommend the services of Kleinfelder for whatever engineering needs an Authority or Town may need."
>
> JOANN MONDSINI, EXECUTIVE DIRECTOR
> RVRSA

05 PROJECT TEAM

Success of a project stems from the commitment of the people dedicated to it. The team members presented in our organizational chart represents a multidiscipline group that will work to ensure the LTCP River Road WWTP Upgrade project is completed successfully. **Kleinfelder will conduct the project from its Princeton, NJ office.** However, this team is supported by a tremendous resource pool of professionals from throughout the Northeast area (and beyond) that will aid them in providing quality solutions for the Authority. The project team chosen this assignment is carefully made up of experienced individuals that are best suited to ensure the goals of the Authority are met.



SUBCONSULTANTS

1. **Morehouse Engineering**
2. **Civil & Environmental Engineering, Inc.**

Resumes for all personnel can be found in Appendix A.

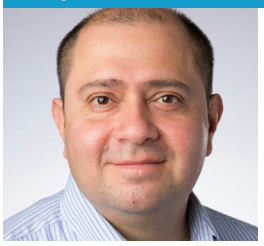
People You Can Count On

Kleinfelder has assembled an experienced team, familiar with the Authority and your LTCP needs; and with technical expertise in the disciplines required ensure the success of this critical stage of the project.

Tim Bradley, PE | Lead Technical Engineer

Mr. Bradley has 42 years of wastewater and water engineering experience encompassing facility planning, design, permitting, financing, construction management, start-up, operations assistance, training, and process troubleshooting in the areas of: wastewater treatment and reuse; biosolids and residuals; wastewater collection and pumping; combined and sanitary sewer overflow control; odor control; industrial wastewater treatment. **As Technical Lead, Tim will lead the project and direct the work of the technical team.**

Felipe S. Contreras, PE, CME, CFM | Project Manager



Mr. Contreras has 23 years civil engineering experience with emphasis in integrated water resources management, water and wastewater treatment and distribution systems, utility efficient operation, and hydraulic modeling. As a Municipal and Utilities Engineer, direct interaction with municipal clients, preparing engineering designs, budgets, plans, specifications, schedules, procurement of grants, and Federal, State, local permits, for a wide variety of projects are some of his responsibilities. He has extensive knowledge in water/wastewater treatment design, CSOs, interceptor sewers and drainage systems. **Through his work as Project Manager on the Collection System Improvements Contract 1 Engineering Services During Construction, he has gained a working familiarity with the Authority and your expectations for collaboration and communication.**

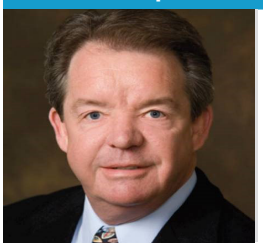
> "I have appreciated the opportunity to get to know the Authority over the past year through the current inspection project. We consider them an extremely important client and our shared values are evident in the work we've completed thus far. We look forward to future opportunities to contribute on local projects for one of the leading wastewater service providers in the region."
>
> FELIPE S. CONTRERAS, PE, CME, CFM

Neil Kulikauskas, PE | Principal-in-Charge / Program Manager; Project Manager

Mr. Kulikauskas has over 27 years of experience managing and leading water and wastewater projects in the Northeast. Mr. Kulikauskas has also served as the Program Manager for on-call engineering contracts with clients including: City of Pittsfield, MA; Greater New Haven Water Pollution Control Authority, Aquarion Water, Borough of Naugatuck, CT; The Hartford Metropolitan District Commission (MDC); and Connecticut Water Company. He will be responsible for the overall execution of the work and regular communications with the Authority. He will ensure that we maintain the highest levels of quality and service to Authority, specifically ensuring that our QA/QC protocols are met and confirming that the project team has the availability to deliver on the project.

> "We've been very happy with their [Kleinfelder] commitment and responsiveness to our needs, and with the professional competence of their staff that have worked on our projects. Neil Kulikauskas has been the point of leadership since 2005, which has allowed for invaluable consistency of service across all our needs."
>
> RICARDO MORALES, COMMISSIONER OF PUBLIC SERVICE AND UTILITIES
> CITY OF PITTSFIELD, MA

Mark Thompson, PE | Technical Advisor

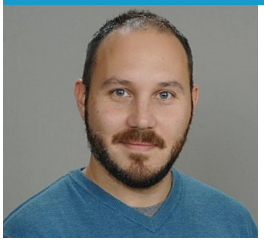


Mr. Thompson has over 40 years of experience, and is an expert, in every aspect of municipal wastewater engineering. He is responsible for the oversight, management, technical competence, and implementation of municipal engineering projects from planning, through design, permitting, financing, and construction administration. Additional competencies include public project economic impact analyses, betterment assessments, permitting, construction cost estimating, environmental reviews, acquiring loans and grants, assistance with acquiring project financing, user charge systems, financial planning, and negotiating inter-municipal agreements. Wastewater projects have ranged up to $75M. **As Technical Advisor, Mark will perform internal reviews and provide guidance and oversight to our wastewater process treatment discipline leads.**

Dingfang Liu, PhD, PE, BCEE | Technical Advisor

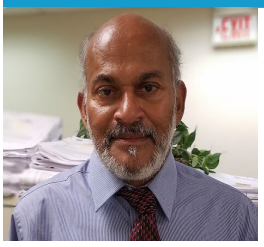
Dr. Liu has 27 years of water resources experience including water/wastewater treatment system design, hydrologic and hydraulic modeling, CSO separation design, stormwater management design/reporting. He is an accomplished expert in mathematic modeling (hydrology/hydraulic, water/wastewater processes, aquatic chemistry), stormwater management (green infrastructure, water quality study and treatment process best management practices [BMPs] design) and advanced water/wastewater treatment processes. Dr. Liu has published 30+ peer-reviewed papers or journal articles in areas including stormwater management, water/wastewater processes, and interfacial phenomenon in environmental systems. **As Technical Advisor, Dingfang will perform internal reviews and provide guidance and oversight to our wastewater process treatment discipline leads.**

Michael Nexon, PE | Design Lead



Mr. Nexon has 19 years of experience in the field of wastewater engineering and science including: Wastewater Collection and Pumping; Water Distribution Systems, Combined Sewer Overflow Facilities; Wastewater / Water Treatment Facilities; Construction and Permitting. Mr. Nexon has recently designed 56-mgd and 14-mgd wet-weather treatment facilities consisting of influent pump station designs at both facilities. Mr. Nexon has experience in over 30 wastewater projects evaluating, designing, constructing various types of pumping systems along with experience in designing and construction of short-term control CSO projects. **Mike will support Tim for all aspects of the wastewater process treatment tasks.**

Tushar Roy | Process and Hydraulics Lead



Mr. Roy is a Principal Engineer at Kleinfelder with more than 30 years of experience in wastewater treatment evaluations, bench and pilot scale testing, treatment system design and construction, with expertise in hydraulic and process modeling. Mr. Roy has a B.S. degree in chemical engineering from a university in India and an M.S. degree in environmental engineering from Lehigh University, where he also completed course work for a Ph.D. Mr. Roy's role will be to serve as a lead process and hydraulic engineer. **Mr. Roy has worked closely with Mr. Bradley on many relevant projects over the last 30 years involving dry and wet-weather capacity expansions and improvements to enable compliance with new effluent limitations utilizing conventional and high-rate treatment technologies at activated sludge and fixed film treatment facilities.**

Subconsultants

Kleinfelder will be utilizing the skills of two subconsultants to support the projects covered by this agreement. We are partnered with Morehouse Engineering (Morehouse) for electrical design services, complementing our in-house electrical design team. Morehouse's local presence will ensure we can maintain efficiency and responsiveness on electrical assignments. Kleinfelder and Morehouse have teamed together on numerous assignments with water and wastewater clients in New Jersey and throughout the Northeast. We will also be teaming with Civil & Environmental Engineering, Inc. (C&E) for all survey work. We have partnered with C&E for survey on multiple water and wastewater projects in New Jersey.

Morehouse Engineering was founded in February of 1990 and is celebrating 33 years in business in 2023. The Company was established with the specific intent of supplying industrial plant design and implementation of process mechanical, medium and low voltage motor control and distribution, and digital automation control and telemetry systems. Water and wastewater process automation and control has been an integral component of their business since their founding.

They have conducted engineering related work at the Authority's Adams Street Plant two times since 1993. Their first assignment, they were called in by the Contractor's bonding agency to help complete the Contractor's work related to the mechanical upgrade of the Plant including the new packed tower trickling filters, Intermediate Pump Station, PURAC process, and related central control system. Under that project they became familiar with the entire workings of the Plant. In 2016 they assisted the electrical contractor with the design and implementation of temporary 2,000kW generator set to support the branch circuit conductor replacement from the Service entrance switchgear. This project required the inspection of each of the 10 branch circuits, related overcurrent protection devices and related building loads.

Civil & Environmental Engineering, Inc. is comprised of a team of dedicated professional staff committed to serving each client's unique and individual needs. Under strong leadership, they are able to deliver high-quality results and have created lasting connections with industry partners. Their full-time survey staff combine decades of experience to provide a wide range of timely and accurate survey services including construction stakeouts, Boundary and ALTA/ASCM Survey's and Final Maps. C&E provides a full scope of services tailored to individual projects.

06 EXPERIENCE & QUALIFICATIONS

Kleinfelder has over 30 years of experience in New Jersey providing the wastewater treatment services requested by the Authority. We have completed planning, design, funding, construction, and all aspects of regulatory support throughout New Jersey and the Northeast.

A brief listing of our recent, relevant project experience is listed in the chart below. Full project descriptions for selective projects relevant to the Authority are included after the chart. These projects demonstrate only a small portion of the extensive wastewater engineering work that Kleinfelder performs and reflect the qualifications and experience of the Kleinfelder team in providing wastewater engineering services to a variety of customers and clients.

The following Table provides a sampling of our relevant Wastewater Treatment Facility experience.

WASTEWATER TREATMENT FACILITY EXPERIENCE

Client Name (in alphabetic order)	State	Grit and Screening Removal	Primary and Secondary Clarifiers	Secondary Treatment	Disinfection	Biosolids Handling	HVAC and Odor Control	Permit Compliance
Borough of Naugatuck	CT	●	●	●	●	●	●	●
Boston Water and Sewer Commission	MA							●
City of Allentown	PA	●	●	●	●	●	●	●
City of Newport	RI						●	●
City of Pittsfield	MA	●	●	●	●	●	●	●
Delaware County Regional Water Quality Control Authority	PA	●	●	●	●	●		
Ewing-Lawrence Sewerage Authority	NJ	●	●	●	●			
Greater Lawrence Sanitary District	MA		●		●	●		●
Lehigh County Authority	PA	●	●	●	●	●	●	●
Logan Township MUA	NJ	●	●	●	●	●	●	●
Massachusetts Water Resources Authority	MA	●						●
Narragansett Bay Commission	RI	●	●	●	●		●	
Passaic Valley Sewerage Commission	NJ							●
Philadelphia Water Department	PA	●					●	
Rahway Valley Sewerage Authority	NJ	●	●	●	●	●		●
Rockaway Valley Regional Sewerage Authority	NJ	●	●	●	●	●	●	●
Somerset Raritan Valley Sewerage Authority	NJ	●			●			●
Springfield Water and Sewer Commission	MA	●	●	●	●	●	●	●
Stony Brook Regional Sewerage Authority	NJ	●	●	●	●	●	●	●
Township of Montgomery	NJ	●	●	●	●	●	●	●
Two Rivers Water Reclamation Authority	NJ		●	●		●		

NORTH BERGEN MUNICIPAL UTILITIES AUTHORITY WOODCLIFF WASTEWATER TREATMENT PLANT UPGRADES

CLIENT

North Bergen Municipal Utilities Authority, NJ

RELEVANCE TO THE AUTHORITY

- Design of filtration process for the direct filtration of trickling filter effluent.
- Two (2) extremely tight site requiring challenging construction sequencing and interim effluent limits.

The North Bergen Municipal Utilities Authority's (NBMUA's) Woodcliff Wastewater Treatment Plant was under an administrative consent order for several years to achieve compliance with a whole effluent toxicity (WET) limit. Kleinfelder was engaged by NBMUA authority engineer to evaluate alternatives to comply with the WET limit, which was particularly challenging due to the extremely confined site. This evaluation indicated that a membrane filtration process could likely achieve compliance with the WET limit, but that due to the site constrains, the membrane process would need to be constructed in the area occupied by the secondary clarifiers, thus resulting in the direct filtration of trickling filter effluent. Based on this design concept pilot testing was recommended to verify performance. Kleinfelder was subsequently engaged to oversee 6 months of pilot testing conducted by the membrane system manufacturer. The pilot testing program results indicated that membrane treatment process would enable the Woodcliff plant to comply with the WET limit.

Based on the results of the pilot testing program, the NBMUA decided to implement the membrane treatment process. Kleinfelder was subsequently engaged to assist in designing the membrane treatment process together with the NBMUA engineer. Additional improvements were also designed to enable the Woodcliff plant to process 2-mgd of additional CSO flow, thereby reducing the discharge of untreated combined sewage to the Hudson River.

Kleinfelder is also performed a re-rating study to demonstrate that the existing Woodcliff Plant, following implementation of the membrane process, will be able to treat approximately 0.6-mgd of additional flow above the current permitted capacity of 2.91-mgd to accommodate anticipated important development along the Hudson River.

Kleinfelder also obtained achievable interim effluent limits from NJDEP that remained in effect during construction.

While construction is currently complete manufacturer issues have not yet been fully resolved, As a result, while the membrane system is able to process dray weather lows, it is not able to process the design peak wet weather flow, due primarily to inadequate performance of the pretreatment system selected by the membrane system manufacturer. The pretreatment system is also unable to handle the elevated TSS concentration that occurs during intermittent filter flushing to reduce biofilm growth. Kleinfelder is currently assisting the NBMUA in developing pilot testing plans for two alternative retreatment systems. Pilot testing is scheduled to begin within 2 to 3 months.

STONY BROOK REGIONAL SEWERAGE AUTHORITY (SBRSA) PENNINGTON PLANT UPGRADE

CLIENT
Stony Brook Regional Sewerage Authority (SBRSA), NJ

RELEVANCE TO THE AUTHORITY
- Disc Filters
- Plant Upgrades
- Filtration
- Design Components
- DRCC Permitting

Kleinfelder developed a facility plan for improvements to upgrade and expand the 0.3-mgd Pennington Plant and subsequently designed the recommended improvements followed by providing construction administration services. The objectives of this project were to address aging infrastructure, enabling compliance with new effluent limitations, expanding capacity and enhancing operational efficiency. A key element of this project was to replace three (3) deep bed sand filters with new stainless steel mesh disc filters, which was the recommended filter option after evaluating several alternatives during the facility planning phase of the project due to cost, space efficiency and ease of operation considerations. The disc filters have been in service for more than a year and are removing TSS to very low concentrations to reduce the particulate CBOD concentration such that the stringent CBOD effluent limit of 5 mg/L can be reliably achieved. This project required DRCC approval which was obtained by Kleinfelder. Projects under this contract include:

SBRSA River Road Plant UV Disinfection and Effluent Filtration Project

Kleinfelder performed an alternatives evaluation study to evaluate options to achieve an effluent disinfection byproduct effluent limit for the 13-mgd River Road Plant and to evaluate filtration alternatives to replace the existing deep bed multimedia filters that had reached the end of their service life. UV disinfection was the selected alternative for compliance with the disinfection byproduct effluent limit and disc filtration was the selected effluent filtration alternative. Kleinfelder subsequently designed the recommended improvements which were sized for the build-out future flow of 19-mgd and a peak flow of 60-mgd. During the design phase, Kleinfelder obtained all required permits and approvals including DRCC approval and assisted SBRSA in financing the project with a NJIB loan. Kleinfelder is currently providing construction administration services. The new stainless steel mesh disc filters are currently under construction and are scheduled to be operational before the end of 2023.

SBRSA Hopewell Plant Upgrade Project

Kleinfelder developed a facility plan for improvements to upgrade the 0.3-mgd Hopewell Plant to address the issues of aging infrastructure and the need to achieve compliance with new effluent limits and to enhance operational efficiency. As a key element of the facility planning process, filtration alternatives were evaluated to replace the deep bed sand filters which had reached the end of their service life and which did not provide sufficient capacity for weak wet weather flows. The selected filtration alternative was to replace the sand filters with disc filters. Kleinfelder was subsequently engaged to design the recommended improvements, obtain all required permits and approvals, including DRCC approval, and to provide assistance in obtaining a NJIB loan to finance the project. The design is currently complete and nearly all permits and approvals have been obtained. Kleinfelder will provide construction administration services as soon as NJDEP issues Authorization to Advertise for bids.

RIVER ROAD WASTEWATER TREATMENT PLANT UPGRADES

CLIENT
Stony Brook Sewerage Authority, NJ

RELEVANCE TO THE AUTHORITY

- Evaluation of disinfection alternatives design of the recommended UV disinfection option for a peak flow of 60 retrofitted into the existing chlorine contact tank to conserve space.
- Evaluation of filtration alternatives and the design of the recommended disc filter options to increase the average daily flow capacity from 13 mgd to 19 mgd.
- Evaluation of influent screening alternatives and design of a new 60 mgd facility.

Kleinfelder evaluated alternatives to achieve a new effluent limitation for disinfection by-products from the River Road Wastewater Treatment Plant.

Kleinfelder has provided numerous engineering services to the Stony Brook Regional Sewerage Authority (SBRSA) over many years, including alternatives evaluations, capacity assessment and facility re-rating, planning, design, permitting, financing assistance, and construction administration services for plant upgrades to the 13.2-mgd River Road WWTP. Kleinfelder has also provided services related to SBRSA's three regional pumping stations and the smaller "Upstream" plants in Hopewell and Pennington. Recent assignments have included the following:

River Road UV Disinfection and Effluent Filtration Project

Kleinfelder evaluated alternatives to achieve a new effluent limitation for disinfection by-products from its River Road Wastewater Treatment Plant and alternatives to either rehabilitate or replace its deep bed granular media effluent filters. Which are nearly 40 years old. Disinfection byproduct compliance alternatives include UV disinfection, chloramination and peracetic acid. Effluent filtration alternatives included rehabilitation and expansion of the existing filters, replacement with disc filters and replacement with membrane filters. Conceptual designs and budgetary capital and O&M costs were developed for each alternative which were sized for the projected build-out flow of 19-mgd. The lowest cost alternative for disinfection byproduct compliance was UV disinfection. The lowest cost filtration alternative was replacement of the existing filters with disc filters. Kleinfelder was subsequently engaged to design the recommended alternatives for this $17 million upgrade of the River Road Plant. The design is currently 90% complete. Kleinfelder is also providing permitting assistance and assistance in obtaining a low interest loan for this project through the New Jersey Environmental Infrastructure Financing Program.

Pennington WWTP Upgrade and Expansion Design

Design of recommended improvements to upgrade and expand the Pennington Plant from 0.3-mgd to 0.45-mgd, and to accommodate significant peak wet weather flows. These improvements include: include a new influent screening system; new primary clarifiers; expansion of the Orbal aeration tanks with modifications to achieve total nitrogen removal; new final clarifiers; replacement of the existing effluent filters with disc filters; polyaluminum chloride storage and feed systems to enable supplemental chemical phosphorus removal; new UV disinfection system; new sludge thickening facilities; and new primary sludge pumps, thickened sludge pumps, return sludge pumps, influent pumps and service water pumps.

Facility planning study for the Upstream Plants in Hopewell and Pennington

This project addressed a wide variety of issues at both plants including nitrate and phosphorus removal, aging infrastructure, capacity expansion and operational improvements to enhance reliability and process control. As part of this project, bench scale testing of coagulation was recently conducted to evaluate the required dose and corresponding cost to two (2) different coagulants. Membrane treatment was evaluated as means to both increase filtration capacity and eliminate the need for chlorine-based disinfection and thereby comply with a new effluent limit for the disinfection byproduct dichlorobromomethane.

RIVER ROAD WASTEWATER TREATMENT PLANT UPGRADES, CONTINUED

Alternatives evaluation, design, financing assistance and construction administration to increase the energy efficiency of the 13.2 MGD River Road Plant

This project consisted of the installation of a new D.O. controlled VFD-driven mechanical surface aerators in the nitrification stage of the plant's two stage activated sludge process. Kleinfelder's work on this project included a detailed assessment of current and future BOD and NH3 loads to the nitrification stage, evaluation of alternative types of high efficiency mechanical surface aerators, evaluation of the cost and potential savings of conversion to fine bubble aeration. This project was successful in significantly reducing energy costs while also providing additional oxygenation capacity for future loads.

Detailed evaluation of alternatives and Facility Plan development for a new Headworks Facility and related improvements including odor control at the River Road Plant

Based on the Facility Plan recommendations, Kleinfelder subsequently provided design, permitting, financing assistance and construction administration services for a new Headworks Facility with a peak flow capacity of 60-mgd.

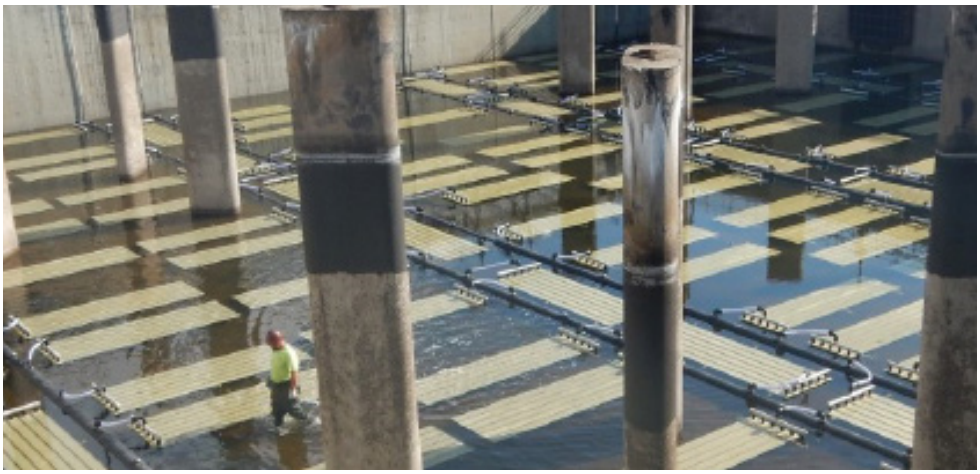
Emergency Generator Study

Used to evaluate resiliency improvements to emergency generators and fuel storage facilities at its three wastewater treatment plants and three regional pumping stations. Based on the study recommendations, Kleinfelder subsequently designed new emergency generators and related improvements for the River Road Plant, Millstone Pumping Station and South Brunswick Pumping Stations. Kleinfelder also assisted SBRSA in obtaining funding for these improvements through special resiliency financing.

DELCORA WASTEWATER TREATMENT PLANT EXPANSION DESIGN

CLIENT
Delaware County Regional Water Quality Control Authority (DELCORA), PA

RELEVANCE TO THE AUTHORITY
- NPDES Permitting Support
- Facilities Planning
- Process Design
- Wet-Weather Capacity
- Nitrification - Denitrification
- Phosphorus Removal
- Energy Efficiency



Existing process air diffusers to be replaced.

The Delaware County Regional Water Quality Control Authority (DELCORA) collects, conveys and treats wastewater generated by residents and businesses throughout Delaware County, Pennsylvania. Kleinfelder provided planning services to DELCORA for evaluating treatment alternatives for various conditions throughout the DELCORA service area. Subsequently, Kleinfelder developed conceptual designs for the recommended improvements, and has been selected to provide detailed design, permitting, and bidding assistance services to implement the complex project.

Evaluation of Treatment Alternatives

DELCORA required evaluation of alternatives to treat approximately 25-mgd of wastewater generated in DELCORA's Eastern Service Area (ESA), as well as alternatives to treat additional wet-weather flow from the ESA and CSO reduction flow from combined sewers within the Western Service Area (WSA). Kleinfelder evaluated a range of alternatives for treating flow from the ESA, including treatment at DELCORA's existing Western Regional Treatment Plant (WRTP) and treatment at a new facility. The evaluation included a detailed capacity assessment of the WRTP and consideration of capital costs, operations and maintenance, and regulatory issues. Alternatives considered for the wet-weather flow included blending, compressible media filters, and enhanced high-rate biological treatment using BIOACTIFLO™.

Recommended Upgrades

Kleinfelder recommended improvements to the WRTP that included an integrated fixed- film activated sludge process to treat 70-mgd of dry-weather flow and a BIOACTIFLO™ process, along with influent screening and UV disinfection, for treating 140-mgd of wet- weather flow. DELCORA has selected Kleinfelder to assist in implementing the project by providing detailed design, permitting, and bidding assistance services. This includes a value engineering study to verify and refine the previously developed conceptual design basis. In addition, Kleinfelder assisted DELCORA in successfully obtaining an increased CBOD load allocation from the Delaware River Basin Commission.

Project Results

Kleinfelder's evaluation of alternatives for managing the ESA flows and CSO wet- weather flows and value engineering study of the recommended alternatives will provide DELCORA with the most cost-effective methods for successfully treating this wastewater. Implementation of the improvements to the WRTP will allow DELCORA to process these flows at the existing facility.

CITY OF PITTSFIELD ON-CALL WASTEWATER SERVICES

CLIENT
City of Pittsfield, MA

RELEVANCE TO THE AUTHORITY

- Facilities Planning
- Pilot Testing of Ballasted Flocculation Technologies
- WWTP Upgrades Design
- Tertiary Treatment Upgrades
- Permitting Support
- Sewer Rehabilitation
- Pump Station Design

Kleinfelder planned, design and managed the construction of a $60M nutrient removal upgrade project in Pittsfield, MA that included construction of a new Tertiary Treatment process (building shown above) using ballasted flocculation for phosphorus removal. The project recently reached substantial completion.

Starting in 2005, Kleinfelder has been providing On-Call Engineering Services with the City of Pittsfield for engineering support in the disciplines of wastewater, stormwater, and environmental services. We have worked closely with the City's Department of Public Utilities to evaluate and implement a comprehensive wastewater facility capital improvement plan to modernize its aging plant. Duties under this contract have included condition and process assessments, process modelling, capital planning, treatment pilot testing, design of extensive infrastructure improvements and upgrades, environmental permitting, and construction management. Kleinfelder has designed and overseen construction of numerous plant improvements, including a new tertiary treatment system, upgrades of the screenings facility, grit collection and removal system, dechlorination facility, aeration system, SCADA system, electrical systems, primary clarifiers, and an energy savings combined heat and power system for digester gas re-use.

A representative sample of these recent services includes the following:

WWTP Tertiary Treatment Upgrade

Kleinfelder led a multi-firm team of engineers in the design and construction services of a nutrient removal upgrade to meet a total effluent phosphorus concentration of 0.1 mg/L. The design process included a comprehensive evaluation and Facilities Plan update of Pittsfield's 17-mgd WWTP to identify other high priority needs. The Nutrient Upgrade was required to meet the NPDES permit. Kleinfelder worked collaboratively with the owner to select the ballasted flocculation process after a comprehensive analysis of alternatives that included life-cycle costs. Pilot testing and the pre-selection of the Comag ballasted flocculation process were conducted prior to design. Other critical near-term needs that were identified in the updated facilities plan were also included in the design. Components of the upgrade include:

- **New Comag Ballasted Flocculation tertiary treatment process and building for removal of phosphorus down to 0.1mg/L effluent TP.**
- Replacement and upgrade of all internal mechanisms for the existing 110 ft. diameter secondary clarifiers and structural tank repairs.

CITY OF PITTSFIELD ON-CALL WASTEWATER SERVICES, CONTINUED

- New gravity thickener for tertiary sludge; upgrade of dewatering process from BFPs to rotary presses, increasing efficiency and capacity of the process.
- Upgrade of WAS thickening process from GBTs to rotary drum thickeners, increasing efficiency and capacity of the process.
- Optimization of the secondary treatment system to reduce loading to clarifiers and increase settleability of sludge, thereby decreasing operational costs and risks of permit noncompliance. Changes include removal of trickling filters and conversion of a humus settling tank into a pre-anoxic zone.
- Conversion of an existing trickling filter to a wet weather holding tank.

WWTP New Laboratory and Administration Building

The existing Laboratory Building was originally constructed in 1938 and converted into the plant laboratory in 1973, 47 years ago. **Kleinfelder led the design for the construction of new laboratory and administrative space to address the many problems with the existing building and laboratory facilities, and to expedite the work due the extremely important role of the laboratory for plant process control, including the new nutrient treatment facilities and reporting.** The design of the new building featured a 5,000 square foot (sf) building with a brick masonry exterior and pitched roofs with standing seam metal panels; site development including a new main entrance access rotary, site lighting and parking areas; and a new septage testing drop-off station. The work also included a hazardous materials evaluation of the existing lab building and selective demolition to allow for re-use of the space.

WWTP Influent Bypass Force Main

Kleinfelder designed and managed the construction of 350 feet of a secondary 36-inch DI force main between the influent pumps and the primary treatment basins. The existing aging force main alignment runs under anaerobic digesters. Failure of this line represents a major risk for the facility. The existing 36-inch force main was lined and the new, less efficient line, serves as redundancy.

WWTP Grit and Primary Upgrades

Kleinfelder provided design and construction services for an upgrade to the grit process, Pump and Power Building, primary clarifier sludge collection equipment, Primary Sludge Pump Building and associated processes and infrastructure at the Pittsfield WWTP. The existing chain and bucket grit channels were modified into a chain and flight collection mechanism, along with grit classifier and final disposal provisions.

Upgrade included replacement of primary clarifier mechanisms with new chain and flights and drives, and the concrete tanks were repaired and coated.

WWTP SCADA System Upgrades

Kleinfelder led the complex effort to upgrade the SCADA system at the Pittsfield WWTP. The first phase of a multi-phase endeavour, the Kleinfelder-led team is responsible for upgrading the existing system to VTSCADA. The upgrade includes new computers and servers, installing new fibreoptic cable to create a loop around the plant, tying in all chemical signals, installing and programming the VTSCADA system, implementing remote access and cybersecurity, modifying control panels, and creating and updating documentation of the system.

WWTP Combined Heat and Power Upgrades

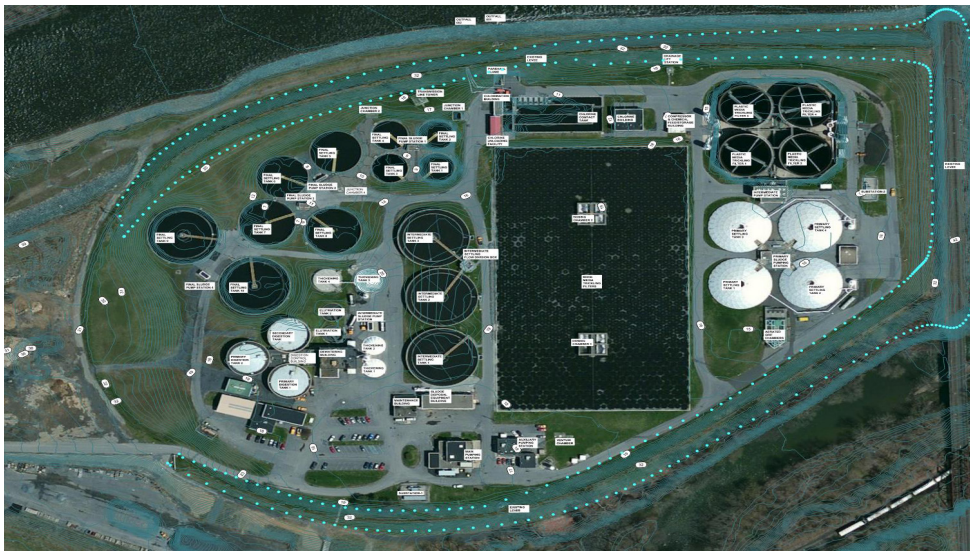
Kleinfelder evaluated the condition and performance of the existing 195-kW Combined Heat and Power (CHP) Microturbines and fuel conditioning system and provided recommendations for future replacement. The microturbines run off conditioned anaerobic digester gas and feed heat to the digester and Pump and Power Building, and electricity to the plant. The CHP system lowers the power demand on the facility and heating fuel usage. Kleinfelder is currently in design for replacement of the microturbines and fuel conditioning system along with implementing process control upgrades to the system.

SANITARY SEWER OVERFLOW MITIGATION PROGRAM

CLIENT
Lehigh County Authority,
Allentown, PA

RELEVANCE TO THE AUTHORITY

- Evaluation of alternatives and designs to lty increase the wet-weather treatment capacity of a WWTP with trickling filters
- Two (2) Confined site limiting the options available to increase wet-weather treatment capacity



The Lehigh County Authority (LCA) operates and maintains the City of Allentown's 40-mgd Kline's Island Wastewater Treatment plant (KIWWTP) and 285-mile collection system through a 50-year lease. Kleinfelder has served the LCA and City of Allentown during the last 10 years in developing and implementing a sanitary sewer overflow (SSO) mitigation program through a combination of sewer rehabilitation to reduce sources of infiltration and inflow and through improvements to the KIWWTP to convey and treat additional wet-weather flow. LCA's SSO mitigation program has encompassed several phases beginning with the issuance of United States Environmental Protection Agency (USEPA) Administrative Orders (AOs) to eliminate collection system SSOs, followed by transition to a Regional Flow Management Strategy approved by Pennsylvania Department of Environmental Protection (PADEP), and the current Act 537 Plan Phase.

Kleinfelder has participated in each of these phases by performing numerous assignments including the following:

- Design and construction administration services to implement the five-year source reduction program presented in the City of Allentown Chapter of the Regional Flow Management Strategy which was developed by Kleinfelder. During this five-year program, 280,000 feet of collection system piping ranging in size from 8-inch diameter to 30-inch diameter was rehabilitated using cured-in-place pipe as well as other rehabilitation methods.
- Based on the success of the five-year source reduction program, Kleinfelder subsequently requested to develop a 10-year source reduction program to rehabilitate additional areas of the collection and conveyance system and to rehabilitate manholes. Kleinfelder is currently designing year 1 of the 10-year program.
- Prepared a detailed report on the maximum month hydraulic capacity of the KIWWTP and utilized this analysis to successfully obtain an increase in the KIWWTP's Hydraulic Design Capacity.
- Conceptual design and preliminary design of improvements to increase the KIWWTP's peak flow capacity to 100-mgd, as the first step in a phased plan to further increase the KIWWTP's peak flow capacity to 120-mgd and ultimately to a capacity of approximately 150-mgd, depending upon the alternatives selected during 537 Plan development.
- Conceptual design of an innovative approach to increase the KIWWTP's peak flow capacity to 120-mgd by enabling the trickling filters to be temporarily operated in parallel rather than series such that all flow receives significant biological treatment.
- Conceptual design of improvements to further increase the wet-weather treatment capacity of the KIWWTP from 120-mgd to 150-mgd with all flow receiving significant biological treatment.

EWING-LAWRENCE SEWERAGE AUTHORITY WASTEWATER TREATMENT PLANT FACILITIES PLAN

CLIENT
Ewing-Lawrence Sewerage Authority (ELSA), NJ

RELEVANCE TO THE AUTHORITY

- Facilities Plan
- Wet-Weather Flows
- NJEIFP Funding
- Asset Management

Kleinfelder prepared a comprehensive Facilities Plan for ELSA's 16-mgd Main Wastewater Treatment Plant to address the following challenges: new effluent limitations for nitrate-nitrogen and dichlorobromomethane (DCBM), aging infrastructure, high wet-weather flows, capacity for future growth, site constraints, and the need to minimize rate increases. This plant utilizes trickling filters for secondary treatment followed by activated sludge for tertiary treatment.

Work elements of the facilities planning study included: wastewater characterization; hydraulic capacity evaluation; treatment capacity evaluation; condition assessment; evaluation of potential plant enhancements including UV disinfection, new preliminary treatment facilities, replacement of existing BFPs, and replacement of existing mechanical surface aerators with new energy efficient variable frequency drive (VFD)-driven aerators; evaluation of expansion alternatives under two different effluent limitation scenarios, i.e., with and without a nitrate effluent limitation; and Facility Plan preparation. A series of Technical Memoranda were prepared to facilitate consensus-building at key points during the project. The recommended improvements were structured into a phased implementation program, with Phase 1 consisting of: a new UV disinfection system; a new preliminary treatment facility incorporating new mechanically cleaned screens, a new grit removal system and odor control system; resiliency improvements including a new effluent pumping system; and replacement or rehabilitation of numerous mechanical and electrical equipment and systems throughout the plant.

Kleinfelder subsequently performed a fast-tracked design of the Phase 1 improvements, which included a new preliminary treatment facility consisting of multiple rake screens followed by a hydraulically induced vortex system for grit removal, a new UV disinfection system, replacement of mechanical and electrical systems throughout the plant and resiliency improvements related to periodic flooding of the receiving stream. **Due to site constraints and the needs to preserve space, the new UV disinfection system was retrofitted into the existing chlorine contact tank, which presented a number of design challenges that were successfully addressed.** Kleinfelder assisted ELSA in obtaining funding for this $30 million project through the New Jersey Environmental Infrastructure Financing Program which included principal forgiveness for the resiliency improvements.

SPRINGFIELD WATER AND SEWER COMMISSION ON-CALL WASTEWATER

CLIENT
Springfield Water and Sewer Commission, MA

RELEVANCE TO THE AUTHORITY

- Long-Term Contron Plan
- Facilities Plan
- Wet-weather Treatment
- Process, Hydraulic Modeling
- Regulatory Support

The Springfield Water and Sewer Commission (SWSC) engaged Kleinfelder in multi-year service contracts to develop a Combined Sewer Overflow (CSO) Long-Term Control Plan (LTCP) and comprehensive Capital Improvement Plan to execute over the next 20 to 40 years. Kleinfelder's approach employed a risk-based method to determine priorities for the various projects. The plan included a thorough assessment of the SWSC's pump stations and 67-mgd (peak flow 180-mgd) Bondi Island Wastewater Treatment Facility.

SRWTF Condition Assessment, Process Performance Evaluation and Facility Capital Improvement Prioritization

Kleinfelder performed a comprehensive condition assessment of the Springfield Regional Wastewater Treatment Facility (SRWTF) based on the equipment age, physical conditions and maintenance record. Kleinfelder also collected data for each of the treatment processes and evaluated their treatment performances. Based on the equipment conditions and their criticality to ensure treatment process performance to comply with permits, Kleinfelder developed a risk-based approach to prioritize the required system improvements. Some of the prioritized recommendations for the SRWTF included electrical upgrades (including stand-by power), grit removal, structural repairs and rehabilitation of process tanks, architectural improvements, clarifier upgrades, odor control improvements, and HVAC and fire protection improvements.

Plant Biological Nutrient Removal Upgrade and Plant Improvements

As part of contract operation procurement effort, the Kleinfelder team developed a list of initial capital investment (ICI) projects for design-build-operation of the SRWTF, including biological nutrient removal upgrade, electrical system upgrade, rake room HVAC upgrade and aeration upgrade. In addition to ICI projects, the Kleinfelder team is also currently assisting the Commission to oversee the design, construction and commissioning of the plant improvement projects, including screening press upgrade, grit removal upgrade, and solid handling upgrade.

Plant Hydraulic and Process Modeling and Evaluations Under Dry- and Wet-Weather Conditions

Our team performed hydraulic and process modeling of the SRWTF, including identification of multiple hydraulic restrictions and limitations that are important when evaluating the plant treatment capacity in the context of the CSO alternatives recommended in the LTCP. To improve secondary clarifier treatment capacity in anticipation of higher peak flow for longer periods, Kleinfelder completed a comprehensive evaluation that included dye dispersion tests, stress tests, settling velocity tests, state-point analysis and computational fluid dynamic (CFD) modeling evaluation of the secondary clarifier. The recommendations of the evaluation have been implemented to improve settling performance during high-flow condition.

SPRINGFIELD WATER AND SEWER COMMISSION ON-CALL WASTEWATER, CONTINUED

As part of the Connecticut River Crossing Project, Kleinfelder designed new pipelines to be installed using open-cut dredging across the Connecticut River (middleground), providing redundant infrastructure to bring combined sewer flows from the City of Springfield (background) to a newly constructed Influent Structure at the Springfield Regional Wastewater Treatment Facility in Agawam (foreground).

Kleinfelder developed a BioWin process model to evaluate biological treatment capacity as well as other unit processes including primary clarifiers, chlorine contact chambers, effluent pumping, and the solids handling process. Analysis of the hydraulic and process models developed by our team for the SRWTF indicated there may be flexibility at the plant to respond to regulatory changes through process modifications and thereby minimize the need for costly capital improvements.

Biosolid Disposal Study

The Kleinfelder team has recently completed an evaluation of biosolids disposal options that included incineration, high-rate anerobic digestion and thermohydrolysis-AD.

Regulatory Support to Mitigate Ever-Evolving Regulatory Compliance Challenges

In our role as the CSO Program Manager, Kleinfelder has supported the SWSC with the ongoing evolution of the approach to CSO optimization and NPDES permit compliance, including the review of process improvements and upgrades to the SRWTF to accommodate anticipated increases to the nitrogen limit in their NPDES permit.

As part of the Commission's strategy for addressing the anticipated increased nitrogen limits, we are currently providing professional services for the analysis of regionalization options including the feasibility of accepting additional flows at the SRWTF from upstream communities to provide an overall long-term net benefit.

Kleinfelder completed a biological nutrient removal evaluation to assess upgrade needs to accommodate additional flow and higher nutrient loading as well as potentially more stringent permit limit.

STONY BROOK REGIONAL SEWERAGE AUTHORITY ON-CALL SERVICES

CLIENT
Stony Brook Sewerage Authority, NJ

RELEVANCE TO THE AUTHORITY

- On-Call
- Facilities Plan
- WWTP Upgrades Design

Since 2007, Kleinfelder has been working with the Stony Brook Regional Sewerage Authority to provide numerous on-call engineering services including alternatives evaluation, facility planning, design permitting, financing assistance, and construction administration services for 13.2 mgd River Road WWTP, the 0.3 mgd Hopewell WWTP and the 0.3 mgd Pennington WWTP. Recent assignments have included the following:

Alternatives Evaluation, Design and Construction Administration

- Evaluation of effluent filtration and disinfection byproduct compliance alternatives for the River Road WWTP. Effluent filtration alternatives included rehabilitation and expansion of the deep bed dual media filters, new disc filters and new membrane filters. Conceptual designs were developed for retrofitting disc filters into the existing filter basin and for a new stand-alone disc filter facility. The lowest cost alternative for accommodating build-out flows was to replace the existing filters with new disc filters. The recommended disinfection byproduct compliance alternative was UV disinfection retrofitted into the existing chlorine contact tank to preserve space. Kleinfelder subsequently recently designed this $16 million project, assisted SBRSA in obtaining a low interest loan and is currently providing construction administration services.
- Detailed facility planning study for the upstream plants in Hopewell and Pennington. This project addressed a wide variety of issues at both plants including nitrate and phosphorus removal, aging infrastructure, capacity expansion and operational improvements to enhance reliability and process control. Kleinfelder subsequently designed the recommended improvements to the Pennington Plant which included replacement of existing multi-media filters with disc filters, expansion of the existing oxidation ditches ls including new aerators, and a new UV disinfection system. Kleinfelder subsequently provided construction administration service for this this $12 million project. Kleinfelder is currently nearing design completion for the recommended improvements to the Hopewell WWTP which also included replacement of existing multi-media filters with disc filters and replacement of chemical based disinfection with UV disinfection. Kleinfelder is also currently assisting SBRSA in obtaining a low interest loan for this project.
- Alternatives evaluation, design, financing assistance and construction administration for a $3 million project to increase energy efficiency of the nitrification process to remove ammonia-nitrogen at the 13.2-mgd River Road Plant through the installation of new D.O. controlled VFD-driven mechanical surface aerators in the nitrification stage of the plant's two stage activated sludge process.
- Alternatives evaluation, design, financing assistance and construction administration services for a new Headworks Facility incorporating new influent screens, new grit removal system and new odor control system. The new Headworks Facility has a peak flow capacity of 60-mgd.

GREATER LAWRENCE SANITARY DISTRICT WASTEWATER TREATMENT FACILITY IMPROVEMENTS AND REGULATORY SUPPORT

CLIENT

Greater Lawrence Sanitary Sewer District, North Andover, MA

RELEVANCE TO THE AUTHORITY

- WWTP Design
- Pump Station Design
- Permitting Support
- Energy Upgrades
- Construction Services

Kleinfelder was retained by the Greater Lawrence Sanitary District (GLSD) to complete design and construction administration of several infrastructure projects for its 52-mgd (peak flow of 167-mgd) wastewater treatment facility (WWTF) and associated pump station through an On-Call Services Agreement. Task orders included regulatory support for NPDES permit renewal and several energy efficiency improvements.

Regulatory Support Services for NPDES Permitting

Kleinfelder provided regulatory support to negotiate NPDES permit limits. USEPA Region 1 notified GLSD in 2018 that their upcoming draft permit would include both metal and total phosphorus limits. GLSD engaged Kleinfelder to provide technical support to negotiate and comment on the draft permit, and work with the District's legal counsel to appeal the permit. To date, our technical experts were able to successfully remove the metal limit by demonstrating no reasonable potential through a clean metal sampling program. In addition, our process engineer analyzed the plant's biological phosphorus removal performance and demonstrated that there is inadequate data to require a total phosphorus limit. This analysis helped negotiation of the stay of permit while allowing the District to collect more total phosphorus samples for a future reasonable potential analysis.

Energy Efficiency Upgrades

The 2009 Energy Audit identified a series of energy efficiency projects. Kleinfelder was tasked with implementing three of the capital projects which included the following:

- Improvements to Aeration System Dissolved Oxygen (DO) Control (26-month payback)
- Plant Water System Improvements (8-year payback)
- Condensate Heat Recovery System Improvements (17-month payback)

Kleinfelder completed a conceptual design for each of the capital projects and made design recommendations based on estimated payback.

The Aeration System DO Control Project consisted of installation of electric actuators on the aeration system control valves. The actuators were controlled by the SCADA system to deliver a precise amount of air in response to the measured DO level in the aeration tanks.

GREATER LAWRENCE SANITARY DISTRICT WASTEWATER TREATMENT FACILITY IMPROVEMENTS AND REGULATORY SUPPORT, CONTINUED

The plant water system was evaluated. It was concluded that the pump was not correctly sized for all activities, wasting vast amounts of energy. To improve operation efficiency, Kleinfelder designed a VFD-driven pumping system that operated in two separate pressure regimes: low output pressure under most operation condition and high-pressure regime when additional pressure was needed for washdown.

The Condensate Heat Recovery System uses waste heat from the biosolid pelletizing facility's air scrubber. The waste heat pre-heats sludge in advance of transfer into the digesters. This project reviewed this heat loop and determined that the annual power demand to operate this system could be reduced by replacing the condensate pumps and installing VFDs.

Based on the GLSD's own estimates, approximately $130,000 is saved annually on reduced power use. This offers an overall simple payback of less than seven years, without considering American Recovery and Reinvestment Act (ARRA) funding the project received.

Effluent Hydro Turbine Feasibility Analysis

Kleinfelder completed a feasibility evaluation which studied the power generating/cost savings potential of installing a low head hydro-turbine in the outfall from this 52-mgd WWTF. Alternative installation arrangements, power generating capacity, electrical interconnection options, permitting requirements, outside funding opportunities, and capital, operation, and maintenance costs were all evaluated. The turbine would provide 800,000 kWh per year at an estimated annual savings of $110,000. Simple payback for the $1.8 million cost of this renewable energy project was estimated at 16 years, without grant funding.

Influent Pump Station Design and Construction

Kleinfelder completed the planning, design, and construction, of this $13 million project which included replacement of 2,500 feet of 72-inch prestressed concrete cylinder pipe (PCCP) force main with fiberglass reinforced pipe (FRP) and related improvements to a 135-mgd pumping station. The team also had to address constructing a new steel pump discharge header (up to 72 inch) inside the pumping station.

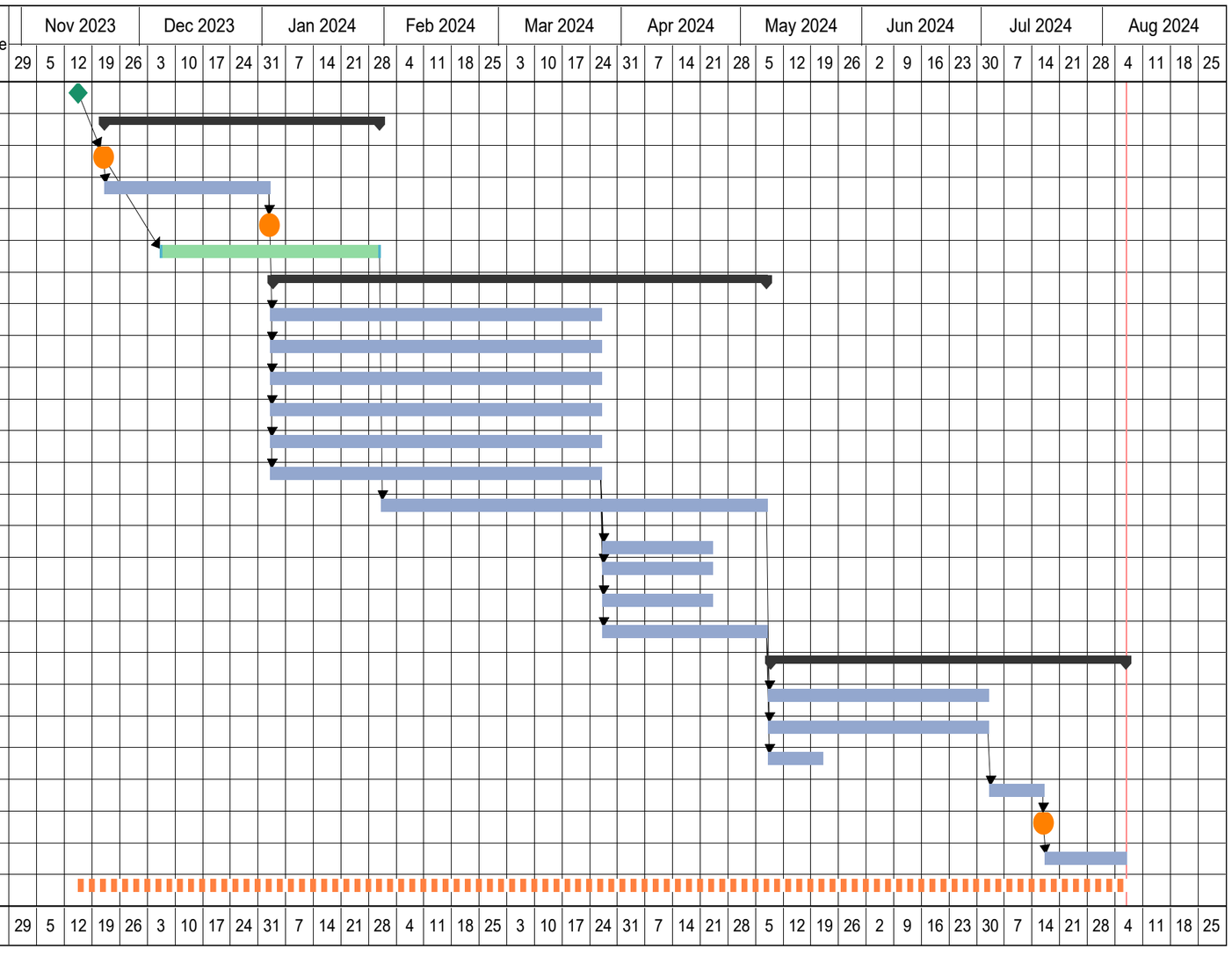
Significant challenges included constructing the 72-inch pipeline up to 25 feet deep in close proximity to and below the active existing 72-inch force main. Construction sequencing was planned in a manner to avoid by-pass pumping and to maintain wet-weather pumping capacity during construction. The plan recognized that protecting and keeping the existing force main operational during construction and minimizing construction impacts to the residential neighborhood were a client priority. Kleinfelder also assisted GLSD with acquiring state revolving fund grants and loans for the full cost of the project.

07 SCHEDULE

Kleinfelder has a history of completing our services on-time, and within the approved budgets, which is one reason why 80 percent of our work comes from repeat business. We are committed to budget requirements while maintaining schedule, meeting the Authority's milestones and providing the Authority with a high quality of service.

ANTICIPATED PROJECT SCHEDULE

	Activity Name	Start Date	Duration (Work Days)	Finish Date
1	**Contract Award**	11/15/23	0.00	11/15/23
2	**Task 1 - Information Gathering and Location Assessment**	11/21/23	50.00	1/30/24
3	**1.1 Kickoff Meeting**	11/21/23	0.00	11/21/23
4	**1.2 Evaluation and Analysis of Existing Conditions**	11/22/23	30.00	1/2/24
5	**1.3 Site Visit**	1/2/24	0.00	1/2/24
6	**1.4 Site Survey**	12/6/23	40.00	1/30/24
7	**Task 2 – Treatment Technology Selection**	1/3/24	90.00	5/7/24
8	**2.1 Mechanical Bar Screen**	1/3/24	60.00	3/26/24
9	**2.2 High Rate Treatment**	1/3/24	60.00	3/26/24
10	**2.3 Wet Weather Flow High Rate Treatment**	1/3/24	60.00	3/26/24
11	**2.4 Piping and Instrumentation Diagram**	1/3/24	60.00	3/26/24
12	**2.5 Chlorine Contact Tank**	1/3/24	60.00	3/26/24
13	**2.6 Electrical Load Evaluation**	1/3/24	60.00	3/26/24
14	**2.7.Footprint and Layout**	1/31/24	70.00	5/7/24
15	**2.8 Construction Sequencing / Maintenance of Operations**	3/27/24	20.00	4/23/24
16	**2.9 Pilot Study Formulation**	3/27/24	20.00	4/23/24
17	**2.10 Regulatory Permits**	3/27/24	20.00	4/23/24
18	**2.11 Cost Estimate**	3/27/24	30.00	5/7/24
19	**Task 3 – Basis of Design**	5/8/24	65.00	8/6/24
20	**3.1 Report Contents**	5/8/24	40.00	7/2/24
21	**3.2 River Road LTCP Improvements (Concept Plans)**	5/8/24	40.00	7/2/24
22	**3.3 Project Timeline/Schedule**	5/8/24	10.00	5/21/24
23	**Authority Review (2 weeks)**	7/3/24	10.00	7/16/24
24	**Draft BODR Review Meeting with Authority**	7/16/24	0.00	7/16/24
25	**Finalize Report**	7/17/24	15.00	8/6/24
26	**3.4 Monthly Project Meetings**	11/15/23	190.00	8/6/24



08 COST

The not-to-exceed fee for the scope of services is summarized below. The fee is based on our proposed on-call hourly billing rates and includes all labor, overhead, profit, and direct expenses related to this assignment.

FEE SUMMARY

	Total Hours	Labor Fee	Direct Costs	Sub-consultant Fee	Total Fee
Task 1 - Information Gathering and Site Assessment	126	$23,340	$600	$10,000	$33,940
Task 2 - Treatment Technology Selection	1,198	$212,305	$360	$62,000	$274,665
Task 3 - Basis of Design Report	462	$84,455	$760	$0	$85,215
Labor Hours	1,786				
Fee		**$320,100**	**$1,720**	**$72,000**	**$393,820**

APPENDIX A:
Resumes

TIMOTHY BRADLEY, PE

Lead Technical Engineer

Mr. Bradley has 42 years of wastewater and water engineering experience encompassing facility planning, design, permitting, financing, construction management, start-up, operations assistance, training, and process troubleshooting in the areas of: Wastewater Treatment and Reuse; Biosolids and Residuals; Wastewater Collection and Pumping; Combined and Sanitary Sewer Overflow Control; Odor Control; Industrial Wastewater Treatment; and Water Storage, Treatment and Distribution.

Office Location
Princeton, NJ

Years of Experience
42

Education

Bachelors, Environmental Engineering, Pennsylvania State University, 1981

Masters, Civil Engineering, Drexel University, Pennsylvania, 1987

Registrations/Certifications

Professional Engineer (PE)-Civil, No. 24GE03410800, NJ

Professional Engineer (PE)-Civil, No. PE035163E, PA

Professional Engineer (PE)-Civil, No. 12117, DE

SELECT PROJECT EXPERIENCE

Ewing-Lawrence Wastewater Treatment Plant, Ewing-Lawrence Sewerage Authority, NJ

Managed a Facilities Planning Study for the Ewing-Lawrence Sewerage Authority's 16 MGD wastewater treatment plant. This plant utilizes plastic media trickling filters for BOD removal and an activated sludge system for ammonia-nitrogen removal. The key issue addressed included expansion to meet the future capacity needs, upgrade to meet future effluent limitations for nitrate-nitrogen and dichlorobromomethane (DCBM), rehabilitation of aging infrastructure to ensure continued reliable performance, and enhancing energy and operational efficiencies to reduce operational costs. Subsequently managed the fast-tracked design and bidding of Phase 1 Improvements with a construction cost of $22.7 million. These improvements include new UV disinfection and effluent pumping facilities, new preliminary treatment facilities, and replacement of mechanical and electrical systems throughout the plant that have reached the end of their useful service life. Also managed permitting and financing assistance services. Currently managing construction phase services.

Stony Brook Regional Sewage Authority, NJ

Managed facility planning, design, permitting and construction phase services for the Stony Brook Regional Sewerage Authority in New Jersey over a 25 year period. Recent projects include: evaluation of alternatives, facility planning, design, permitting and construction administration services for a new $10 million, 60 MGD peak flow capacity Headworks Facility; evaluation of alternatives, design, and financing assistance of a $6 million emergency generator project to improve the resiliency of standby power at the River Road Plant and Millstone and South Brunswick pumping stations; design and construction phase services for replacement nitrification aerators and chemical feed systems for the River Road Plant, and a phosphorus removal study for the River Road Plant and the 0.3 MGD Hopewell Plant and 0.3 MGD Pennington Plant. Other projects have included the design of biofilters for odor control, replacement of gaseous chlorine and sulfur dioxide feed systems with sodium hypochlorite and sodium bisulfite storage and feed systems in a new disinfection building, first U.S. installation of fully enclosed 14-roller belt filter presses, new nitrification settling tank and dome-covered gravity thickener, density current baffles for the existing nitrification settling tanks, rehabilitated multimedia filters, modifications to the sludge blending tank, a new septage receiving facility, a plant protection line with diversion structure and new chlorine contact tank, and miscellaneous pumping and piping modifications. Also managed a study to justify an increase in the rated capacity of the SBRSA's

KLEINFELDER
Bright People. Right Solutions.

Timothy Bradley, continued

River Road plant from 11.7 to 13.2 MGD through a detailed process and hydraulic capacity evaluation of all unit processes and plant components. Managed annual on-call general services for a 25 year period.

Wastewater Treatment Plant and Collection System Services, Rockaway Valley Regional Sewerage Authority, NJ

Managed a variety of services for the Rockaway Valley Regional Sewerage Authority's 12 MGD wastewater treatment plant and collection system including: development of the 5-Year Planning Report, evaluation of effluent filtration alternatives, annual inspection of the WWTP and meter chambers, evaluation of phosphorus removal costs, design review of the proposed Monroe Street Pumping Station and Force Main project, and design services for replacement of an existing chemical storage and feed system for odor control. Currently managing a re-rating study of the wastewater treatment plant which includes a detailed assessment of the hydraulic conveyance and treatment capacity of each component of the plant.

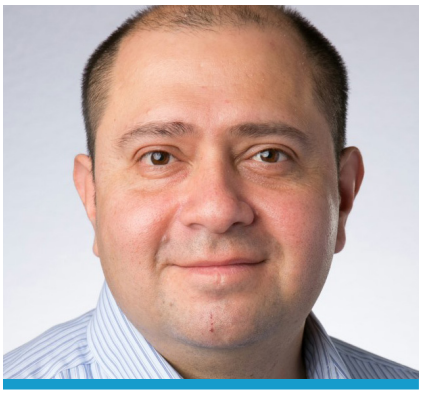
Facility Planning and Nutrients Reduction Cost Estimation Study, New Jersey Harbor Dischargers Group, NJ

Managed a facility planning and nutrients reduction cost estimation study for the New Jersey Harbor Dischargers Group, a consortium of ten wastewater authorities in northern New Jersey – PVSC, MCUA, BCUA, JMEUC, RVSA, LRSA, NHSA, SMUA, EMUA, and NBMUA - that collectively discharge approximately 750 MGD to the New York-New Jersey Harbor. Identified recommended technologies to achieve "high", "medium", and "low" levels of additional nitrogen and carbon removal from air activated sludge, pure oxygen activated sludge and fixed film treatment facilities. Directed the development of conceptual site plans and preparation of capital and O&M cost estimates and corresponding cost curves for the 11 wastewater treatment plants owned by the 10 members of the group. The information generated through this study will be utilized by EPA during the process of finalizing a TMDL for the New York-New Jersey Harbor Estuary.

Kline's Island Wastewater Treatment Plant, Allentown, PA

Description 1: Managed preparation of a Conceptual Expansion Plan for the 40 MGD Kline's Island Wastewater Treatment Plant to assess the worst case potential economic impact resulting from passage of the proposes DRBC Special Protection Waters Regulations. Currently evaluating alternatives to identify the most cost effective option for expanding and upgrading the plant for nitrogen removal based on DRBC's No Measurable Change Analysis and guidance on grandfathered loads.
Description 2: Evaluated alternatives and developed a Conceptual Upgrade and Expansion Plan for the 40 MGD Kline's Island Wastewater Treatment Plant located in Allentown, PA to increase plant capacity to 44 MGD and to comply with the DRBC Special Protection Waters Regulations regarding nitrogen and phosphorus. This facility is a two stage trickling filter plant which utilizes plastic media for BOD removal and rock media for nitrification. Previously managed preparation of a master plan update for this plant, which included condition and capacity assessments, development of flow and load projections, and interfacing with EPA and PADEP on issues related to treatment of wet weather flow. Also managed the design and construction of improvements to rehabilitate the primary clarifiers and aerated grit chambers. In a related project, managed the design of a third aerated grit chamber and screening facility to expand the peak flow capacity to 93 MGD. Currently serving as Program Manager for a long term project to reduce I&I and eliminate sanitary sewer overflows.

KLEINFELDER
Bright People. Right Solutions.



FELIPE S. CONTRERAS, PE, CME, CFM

Project Manager

Mr. Contreras has 23 years civil engineering experience with emphasis in integrated water resources management, water and wastewater treatment and distribution systems, utility efficient operation, and hydraulic modeling. As a Municipal and Utilities Engineer, direct interaction with municipal clients, preparing engineering designs, budgets, plans, specifications, schedules, procurement of grants, and Federal, State, local permits, for a wide variety of projects are some of his responsibilities.

Office Location
Princeton, NJ

Years of Experience
23

Education

Bachelors, Civil Engineering, University of Los Andes, 1999

Masters, Water Resources Engineering, University of Los Andes, 2000

Registrations/Certifications

Professional Engineer (PE), No. 24 GE 04926000, NJ

Professional Engineer (PE), No. PE091451, PA

Professional Engineer (PE)-Civil, No. 56304, MA

Certified Municipal Engineer (CME), No. 43300, NJ

Certified Floodplain Manager (CFM), No. US-13-06798

Professional Affiliations

American Society of Civil Engineers

International Water Association

National Society of Professional Engineers

New Jersey Society of Civil Engineers

Association of State Floodplain Managers

KLEINFELDER
Bright People. Right Solutions.

SELECT PROJECT EXPERIENCE

Pequannock Water Treatment Plant Process and Operational Upgrades, City of Newark, NJ

Mr. Contreras is the Project Manager and lead process engineer for the 60 MGD Pequannock Water Treatment Plant Process and Operational Upgrades Project. The project includes the optimization of coagulation, the addition of coagulant flash mixing, correction of filter integrity problems (remove crust, verify media sizing), enhancement of filter performance, modification of the filter flow control, and optimization of the filter backwash including pilot testing air scour and improving backwash flow and capacity through backwash pump modifications.

ELSA Wastewater Treatment Facilities Upgrade Design, Lawrence, NJ

Mr. Contreras completed his participation in the construction management phase services of improvements to the Ewing-Lawrence Sewerage Authority's 16 MGD WWTP.

City Wastewater Treatment Plant and Sewer Rehabilitation, Long Hill Township, Morris County, NJ

Mr. Contreras led the design and development of the plans, specifications, permitting and funding for the WWTP improvements and sewer system rehabilitation. The project included the installation of new phosphorus removal system, new influent pumps, new return pumps, new disc filters and upgrades to the ultraviolet disinfection building.

Wastewater Treatment Plant Upgrades, Madison Chatham Joint Meeting, Morris County, NJ

Mr. Contreras is currently leading the design and development of the plans, specifications, permitting and funding for the WWTP improvements; project includes the replacement of the screen, new mixing equipment at the oxidation tank, new effluent filtering building, new belt filter press, and raw water pumps.

Pump Station No. 7 Upgrades, LEHMUA, Little Egg Harbor, NJ

Mr. Contreras is currently finalizing the design of the project. The work includes the construction of a new wet well including pumps, a new electric grinder, and the installation of flooding protection systems to protect the electrical/generator room and chain link fence around the property.

Felipe Contreras, continued

I&I Source Reduction, Year 2, Lehigh County Authority, PA
Mr. Contreras led the design and development the plans, specifications, the scope of work for the project includes the rehabilitation of existing sewer pipelines, including 6,721 lf of 8-inch heavy cleaning, 738 lf of 10-inch heavy cleaning, 1,016 lf of 12-inch heavy cleaning, 985 joints of 8-inch grout sealing, 163 joints of 10-inch grout sealing, 119 joints of 12-inch grout sealing, 95 joints of 24-inch grout sealing, 240 lf of 8-inch CIPP sectional liner, 145 lf of 10-inch CIPP sectional liner, 2,275 lf of 8-inch CIPP full liner, 163 lf of CIPP full liner, 1,086 lf of 12-inch CIPP full liner and 324 lf of CIPP full liner. All CIPP sectional liners will be a minimum of 15 lf. The project also includes by-passing flows, as necessary, to accomplish the work.

West Calabreeze Pump Station Upgrade, Little Egg Harbor MUA Engineer
Mr. Contreras designed and developed specifications for the installation of a PVC liner inside the wet well at this location.

Giffordtown Pump Station Upgrade, Little Egg Harbor MUA Engineer
Mr. Contreras designed and developed specifications for the installation of a hydraulic grinder inside the wet well at this location.

Pump Station No. 5 Reconstruction, Little Egg Harbor MUA Engineer
Mr. Contreras designed and developed specifications for the reconstruction of pump station No. 5. Work included new manholes, wet well, valve chamber, new pumps and control panel.

Frog Pond and Sandford Street Water and Sewer Expansion, Little Egg Harbor MUA Engineer
Mr. Contreras designed and developed specifications for the water and sewer extensions; approximately 850 lf of 8-inch PVC Sanitary Sewer, 890 lf of 8-inch DIP water main, manholes, fire hydrants, sewer and water household connections, and paving the road.

Optimum Pressure Plane Implementation and Methodology – Hydraulic Sectors 8 and 35, Water and Sewerage Systems Research Center, University of Newcastle Upon Tyne
Mr. Contreras designed pressure reduction stations. Determined the optimum location of flow meters and pressure meters. Linked the reading scheme for the equipment installed in the network with customer consumption readings and consumption patterns in both hydraulic sectors. Designed a survey for 300,000 customers that included geographic information, water meters, consumption patterns, type and storage facilities. Verified the construction of the hydraulic model Sector 35 and Sector 8, including the pipes and the geo-location of customers (GIS). Created and evaluated a methodology for the optimum service pressure for any district meter area in the city. Implemented a pressure management strategy to reduce leakage and improve system operation.

KLEINFELDER
Bright People. Right Solutions.

NEIL KULIKAUSKAS, PE

Principal-in-Charge/Program Manager

Mr. Kulikauskas is a civil and environmental engineer with extensive management experience helping to lead programs with public and private sector water and wastewater clients throughout the Northeast. He carries a diverse background on various types of projects, thoroughly involved in all aspects ranging from feasibility planning and contract administration to technical design and throughout all aspects of construction. His experience covers wastewater treatment plant upgrades, sanitary sewer system design and rehabilitation, pump station design and rehabilitation, hydraulic modeling, drainage systems analysis and design, CSO removal, stormwater management, water distribution system analysis and design.

Office Location
Rocky Hill, CT

Years of Experience
27

Education

Bachelors, Civil Engineering, University of Connecticut, Connecticut, 1997

Masters, Environmental Engineering, University of New Haven, Connecticut, 2008

Registrations/Certifications

Professional Engineer (PE)-Civil, No. PEN.0023174, CT

Professional Engineer (PE)-Civil, No. 48483, MA

Confined Space Entry, OSHA

Professional Affiliations

American Society of Civil Engineers

Connecticut Society of Civil Engineers

Water Environment Federation

New England Water Environment Association

Connecticut Association of Water Pollution Control Authorities

Connecticut Water Pollution Abatement Association

SELECT PROJECT EXPERIENCE

Wastewater Treatment Plant (WWTP) Nutrient Upgrades, City of Pittsfield, MA
Program manager for development of the WWTP Facilities Plan to layout improvement/upgrade plans balancing repair and replacement needs of aging equipment and process upgrade requirements for regulatory compliance. The final design team developed construction documents for $65 million of Nutrient Removal Upgrade for City's 17 MGD WWTP, to achieve compliance with the City's NPDES permit and EPA Administrative Order that contains stringent limits for Total Phosphorus Limit (0.1 mg/l) as well as nitrogen loading requirements. The WWTP Upgrade consists of a new Ballasted Flocculation process (CoMag), Nitrogen Removal Upgrade, Secondary Clarifiers Upgrade, Solid Handling Upgrade and other ancillary plant-wide improvements. Upon completion of the WWTP Upgrade, the CoMag Ballasted Flocculation process will be the largest installation in the United States. Mr. Kuilkauskas is also the Project Manager and Client Manager for the design and construction of the Nutrient Removal Upgrade project.

Naugatuck Wastewater OPM for Contract Operations and ICIs, Naugatuck, CT
Program Manager for Owner Project Manager (OPM) for oversight and evaluation of the Borough's contract operations for the treatment plant, sewage sludge incinerator, and collection system. This annual contract included reviewing operational data and performing annual audit and evaluation of the contract operator. This work included design and construction review and oversight for the planned ICIs that are part of the new contract operations service agreement for the Wastewater Treatment Facility (WWTF) and lease agreement for the Sewage Sludge Incinerator (SSI). The agreement for ICIs that includes an estimated capital improvement cost of $12.5M at the WWTF (completed over 24 months) and $9.0M at the SSI (completed over 13 months).

Water and Wastewater Due Diligence, Private Water Company
Program manager for one of Connecticut's largest private water suppliers in performing due diligence activities for their potential wastewater system acquisitions. Mr. Kulikauskas works closely with the Engineering and Corporate staff to perform investigations, evaluations and provide recommendations on the condition and value of potential wastewater system assets.

KLEINFELDER
Bright People. Right Solutions.

Neil Kulikauskas, continued

Wastewater Treatment Plant (WWTP) Phase 2 Upgrades, Easthampton, MA
As part of a plant upgrade and expansion, Mr. Kulikauskas was responsible for the bid procurement and construction administration portions of the project. His duties entailed coordinating with DEP, issuing clarifications, reviewing shop drawings, reviewing and processing payment requests and performing site visits.

Nutrient Removal and Denitrification, Water Pollution Control Facility, Litchfield, CT
As part of a plant upgrade and improvement project, Mr. Kulikauskas was responsible for converting the existing secondary treatment tanks to allow for biological nutrient removal and denitrification. He modeled the biological processes of the existing facility using BioWin32 software. Based on the model he designed the conversion of the existing secondary treatment process to include nitrification and denitrification processes. In addition to the modifications to the existing piping and tanks, the design also included specifying aeration and pumping equipment. Design plans and construction specifications were prepared in connection with this expanded secondary treatment system.

Wasteater Treatment Plant (WWTP) Aeration Upgrades, City of Pittsfield, MA
Mr. Kulikauskas was project manager for the fast-track design of the conversion from mechanical aerators to a diffused fine-bubble system at the Pittsfield WWTP. The project included new high-speed blowers, an 800-kw generator, and a new building to house the blowers and control equipment. The project received 100% federal stimulus funding for construction.

Naugatuck Wastewater Facilities Planning and SSES, Borough of Naugatuck, CT
Program manager for condition and capacity evaluations of the wastewater collection system and the Naugatuck Wastewater Treatment Facility (WWTF). An Inflow and Infiltration (I/I) evaluation followed by a sewer system elimination survey (SSES) in the collection system were completed to determine the optimum locations for capital projects aimed at reducing I/I in the collection system to alleviate conditions at the WWTF. Process evaluations at the WWTF included a biological process model of the secondary treatment system for biological phosphorus removal.

Northern Interceptor Sewer Rehabilitation Preliminary Design, Metropolitan District Commission, East Hartford, CT
Mr. Kulikauskas serves as principal-in-charge for preliminary design of the rehabilitation of 9,000 feet of 24-inch to 30-inch vitrified clay and reinforced concrete gravity sewer interceptor in East Hartford. Northern Interceptor is one of two primary influent lines into the East Hartford Wastewater Treatment Facility and dates to the early 1900's. The interceptor includes a crossing of Interstate 84, State Route 44, two force main discharges, and multiple segments along easements. Tasks include field investigations, including CCTV under bypass, manhole inspections, alternatives analysis and recommendations.

KLEINFELDER
Bright People. Right Solutions.

MARK THOMPSON, PE

Technical Advisor

Mr. Thompson is an expert in wastewater treatment and collection system planning, design, construction and rehabilitation. He has been in charge of planning, design, construction and rehabilitation projects for several dozen municipalities and districts. The projects have ranged up to $75M and have also included related utility system upgrades (water and drainage), as well as roadway improvements. Pumping stations have ranged from up to 135 MGD, and force mains up to 72 inches. Additional competencies include trenchless pipe rehabilitation, permitting, cost estimating, environmental reviews, acquiring loans and grants, assistance with acquiring project financing, user charge systems, and negotiating inter-municipal agreements

Office Location
Boston, MA

Years of Experience
48

Education

Bachelors, Civil Engineering, Northeastern University, Massachusetts, 1975

Masters, Civil and Environmental Engineering, Northeastern University, Massachusetts, 1980

Registrations/Certifications

Professional Engineer (PE)-Civil, No. PE.0004241, RI

Professional Engineer (PE)-Civil, No. 5261, NH

Professional Engineer (PE)-Sanitary, No. 30505, MA

Professional Engineer (PE)-Civil, No. PE10939, ME

Professional Engineer (PE)-Civil, No. 74867, FL

Professional Affiliations

American Society of Civil Engineers

Boston Society of Civil Engineers

New England Water Environment Associationn

SELECT PROJECT EXPERIENCE

Wastewater Treatment Plant (WWTP) Nutrient Upgrade, City of Pittsfield, MA
Senior construction manager and technical advisor for construction of a $70 million plant wide upgrade at the 17 MGD Pittsfield, MA WWTP. Major project components include a new tertiary treatment process to remove phosphorus to below 0.1 mg/L with the Co-Mag ballasted flocculation process; new sludge dewatering equipment; replacement of all secondary clarifier mechanisms, weirs, and influent gates; and modification of the biological secondary treatment process. The trickling filters are being converted to wet weather holding tanks and the secondary process is being converted to the MLE process.

Narragansett Bay Commission, Field's Point Wastewater Treatment Facility (WWTF) Upgrade, Providence, RI
Mr. Thompson served as the technical advisor for upgrades and improvements to the 77 MGD Field's Point WWTF which provide tertiary treatment to reduce nitrogen effluent concentration to 5 mg/l or less to reduce eutrophication of Narragansett Bay. The WWTF will be the largest in the world to employ the Integrated Fixed Film Activated Sludge (IFAS) wastewater treatment process for biological nitrogen removal. The ten aeration basins will each be segmented into seven zones to facilitate the IFAS process. Additional facilities necessary to accommodate the IFAS process include: four new screw pumps; eight new turbo aeration blowers; an intermediate screening building; and a chemical feed building. Additionally, this $75 million project upgraded or replaced aging treatment equipment and buildings throughout the facility, including: a new LEED certified operations building; improvements to grit handling and scum concentrator facilities; and replacement of mechanical equipment in 13 clarifiers.

East End Treatment Facility Upgrades, Portland Water District, Portland, ME
Mr. Thompson acted as a technical advisor for a design-build project to improve headwork and secondary bypass systems for the East End wastewater treatment facility. EEWWTF is PWD's largest treatment plant with 36.8 MGD capacity and its operations are often impacted by the high flow conditions during wet weather. The improvement project included influent screening, emergency flow containment, secondary effluent alternative flow circuit, and secondary effluent flow meter replacement. A second project at the WWTF consisting of upgrades to the primary sludge handling facilities and primary sludge piping gallery upgrades.

KLEINFELDER
Bright People. Right Solutions.

Mark Thompson, continued

A detailed 3D scan of the primary sludge pumping area and pipe gallery was used to accurately capture the existing conditions for development of alternate layouts to allow for ease and continuity of operation. These 3D scans were developed into renderings that greatly accelerated the conceptual primary sludge piping routing design.

North Brookfield WWTF, Town of North Brookfield, MA

Mr. Thompson is the principal in charge for this project. Kleinfelder was commissioned to develop a wastewater treatment facilities plan and design to address its wastewater treatment plant's short and long-term needs, including compliance with the Town's NPDES discharge permit requirement to achieve 0.1 mg/l total phosphorus in the effluent. The plant was last upgraded in 1996. It was designed to treat 0.76 MGD of flow and receive septage from in-town as well as neighboring communities. Most of the equipment is near the end of its useful life, and the plant controls are mostly manual and demand high operator attention and labor. Upgrades and improvements included: new Administration and Lab Building; expanded septage storage and automated receiving equipment; renovated headworks; anaerobic zones in the aeration basins; cloth media filters for phosphorus removal; new clarifier mechanical equipment; new sludge dewatering equipment; and flow paced chemical feed systems. Mr. Thompson assisted the Town with acquiring grant and loan funding from USDA and the MassDEP SRF program for the $13M project.

WWTF Upgrades, Greater Lawrence Sanitary District WWTF, North Andover, MA

Mr. Thompson managed the design and construction of various upgrades to this 52 MGD WWTF, including replacement of plant water and condensate heat recovery pumps with much more efficient pumps, and improvements to the aeration tanks dissolved oxygen control system. The improvements will provide an almost immediate pay back due to the power savings. ARRA stimulus funds were used to fund the project.

Wastewater Treatment Facility Upgrade, Templeton, MA

Mr. Thompson Managed the design and construction of this $6 million project, which renovated two buildings, added a new headworks building, effectively downsized the WWTF, replaced aging mechanical equipment, provides a consistent tertiary level of wastewater treatment, and meets stringent NPDES limitations on its discharge. The upgrade of the WWTF was accomplished in accordance with an Administrative Consent Order from the Department of Environmental Protection

Wastewater Treatment Facility Upgrade, Town of Kittery, MA

Mr. Thompson managed the design and construction of the expansion and upgrade of this southern Maine treatment plant. The capacity was increased from 1.2 to 2.4 MGD, and the activated sludge process was replaced by sequencing batch reactors using SBR's allowed the plant capacity to be doubled without constructing and new tankage. A new headworks and chlorination/dechlorination facilities were also constructed as part of the project. In addition to the technical aspects of the project, Mr. Thompson was responsible for budget control, project schedule, and interdisciplinary coordination. Significant design issues included: limited site area; unstable soils, odor control, and the requirement to maintain secondary treatment during construction. The project received an Engineering Excellence award from the American Consulting Engineers Council.

KLEINFELDER
Bright People. Right Solutions.

DINGFANG LIU, PHD, PE, BCEE

Technical Advisor

Dr. Liu has over 27 years of experience in water and wastewater treatment system design, evaluation, and process modeling. As wastewater treatment plant lead engineer, he has serviced many communities to improve their water/wastewater treatment plant with design flows ranging from 0.025 MGD to 180 MGD. His project experiences ranges from concept through construction and start-up. Dr. Liu's experience also includes procurement, design and construction of private/public projects under various delivery methods including design-build, design-build-operate, construction management at risk as well as other alternative delivery methods. His experience includes providing technical services for both design-builder as their design engineer and owner as their representative. He also served as expert witness or key technical lead to assist client's legal needs in responding to their consent decree, TMDL and Plant or MS4 NPDES permits.

Office Location
Boston, MA

Years of Experience
27

Education

Bachelors, Environmental & Public Health, Nanchang Institute of Aeronautical Technology, 1993

Masters, Environmental and Earth Science, Chinese Academy of Science, 1999

PhD, Civil Engineering, Louisiana State University, 2001

Registrations/Certifications

Professional Engineer (PE), No. PE.69064, OH

Board Certified Environmental Engineer (BCEE), No. 11-20058, AAEES

Professional Affiliations

Water Environmental Federation, Committee Member

New England Water Environmental Association

American Water Works Association

American Society of Civil Engineering

SELECT PROJECT EXPERIENCE

Wastewater Treatment Plant (WWTP) Facilities Plan, Nutrient Removal Upgrade Final Design and Construction Services, City of Pittsfield, MA

Lead process engineer for development of the WWTP Facilities Plan to layout improvement/upgrade plans balancing repair and replacement needs of ageing equipment and process upgrade requirements for regulatory compliance. Leading final design team to develop construction documents for $65 million cost of Nutrient Removal Upgrade for City's 17 MGD WWTP, to achieve compliance with the City's NPDES permit and EPA Administrative Order that contains stringent limits for Total Phosphorus Limit (0.1 mg/l) as well as nitrogen loading requirements. Duties including service during construction, testing and commissioning of the upgrade process. The WWTP Upgrade consists of a new Ballasted Flocculation process (CoMag), Nitrogen Removal Upgrade, Secondary Clarifiers Upgrade, Solid Handling Upgrade and other ancillary plant-wide improvements. Upon completion of the WWTP Upgrade, the CoMag Ballasted Flocculation process will be the largest installation in the United States. Lead regulatory specialist to assist the City strategize negotiation and response to NPDES permitting effort including development and execution of a clean sampling program to eliminate the metal limits from current permit as well as assessment of Long Island Sound nitrogen study impact to future limits.

Combined Sewer Overflow (CSO) Program Management, SRWF Regulatory & Policy Support, Springfield Water and Sewer Commission (SWSC), Springfield, MA

Lead wastewater process engineer assisting the SWSC in the assessment of the SRWTF condition, performance and improvement needs for implementation of CSO Long-term Control Plan and Comprehensive Wastewater Management Plan. Assisting SWSC on all regulatory and policy issue regarding the SRWTF, including negotiation of the National Pollutant Discharge Elimination System (NPDES) permit for the SRWTF on nitrogen limits and advising the Commission on potential impact from the on-going Long Island Sound nitrogen strategy studies. Lead Process and Water Quality Engineer in the development of a regional approach to nitrogen trading and permitting.

KLEINFELDER
Bright People. Right Solutions.

Dingfang Liu, continued

Hydrology/Hydraulic Model Improvement, Narragansett Bay Commission, Providence, RI

Senior technical consultant for hydraulic modeling. Duties include expanding the Commission's model to include additional member communities with separated sanitary sewer system, calibrating the model with the commission's historical metering data and evaluating potential improvements to the conveyance system to alleviate sanitary sewer overflow.

On-call Services for Greater Lawrence Sanitary District (GLSD), North Andover, MA

As lead process engineer, assessed current operation practices and impacts by the draft NPDES permit. GLSD's wastewater treatment facility is a 52 MGD plant (130 MGD peak capacity) incorporated with secondary by-pass. The new draft NPDES permit includes many changes that could potentially impact the operation of the plant, especially during wet weather condition. provided regulatory assistance service to negotiate and comment on modifying the draft permit. Other tasks involved include evaluation, design and upgrade of plant water system and its septage receiving facilities.

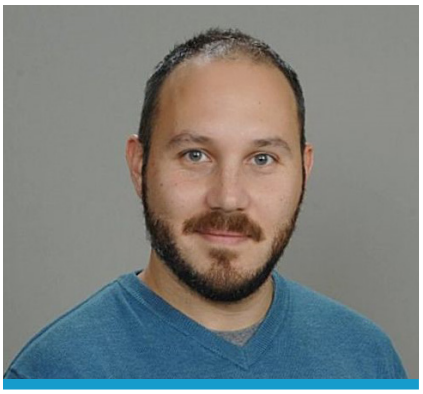
Fort Point Channel Recommendation Project, Boston Water and Sewer Commission (BWSC), Boston, MA

Project engineer for the ongoing $660,000, sewer network (outfall 070 tributary area) investigation, illicit discharge detection and elimination (IDDE) and water quality analysis project for improvement of water quality in the Fort Point Channel. In addition to investigation of sewer network connectivity to identify potential cross connections between sewer and drain system, the project also involves the inspection of the Roxbury Canal Conduit (RCC) and Dorchester Brook Conduits (DBC), two major pipelines in the Fort Point Channel CSO 070 system that range in size up to 20-foot by 15.5-foot twin box-shaped reinforced concrete culverts. The RCC and DBC are tidally influenced combined sewer outfall conduits that directly discharge into the Fort Point Channel where dry-weather water quality issue have been observed. Mr. Liu is responsible for overseeing project works including developing work plan, reviewing record information of the CSO 070 system, verifying records with field inspections and performing inspection of the RCC and DBC, IDDE (building lateral investigation, dye test, water quality sampling and CCTV) and water quality analysis of Fort Point Channel.

On-Call Service for Lynn Water and Sewer Commission (LWSC), Lynn, MA

As lead process engineer, assessed condition and capacity of LWSC's Regional Wastewater Treatment Facility (LRWTF), a 25.8 MGD plant with peak capacity of 78 MGD and develop standard operation procedures for high flow management to comply with MassDEP's Administrative Compliance Order and a CSO abatement plan to comply with ACO goals. Other tasks include optimized plant operations including influent pump station, primary and secondary processes. Duties also include to update The Supplement Facilities Plan by evaluation of the treatment plant's existing conditions and performance, assessed its dry weather and wet weather treatment capacities, developed alternatives to improvement its treatment performance and recommended the most cost-effective option to comply with regulatory requirement.

KLEINFELDER
Bright People. Right Solutions.



MICHAEL NEXON, PE

Design Lead

Mr. Nexon has 19 years of experience in the field of water/wastewater engineering and science including: Wastewater Collection and Pumping; Water Distribution Systems, Combined Sewer Overflow Facilities; Wastewater / Water Treatment Facilities; and Construction and Permitting. Mr. Nexon has worked and contributed to a number of wastewater treatment facility upgrades which included rotating disc filters. Currently Mr. Nexon is providing on-site and office management support for Stony Brook Regional Sewerage Authority's (SBRSA) River Road WWTP UV Disinfection and Effluent Filtration Project. Project includes five (5) disc filtration units rated for max monthly flow of 22 MGD and max daily flow of 48.2 MGD.

Office Location
Princeton, NJ

Years of Experience
19

Education
Bachelors, Civil Engineering, University of Hartford, Connecticut, 2004

Registrations/Certifications
Professional Engineer (PE)-Civil, No. 24GE04935300, NJ

Professional Affiliations
Water Environment Federation

American Water Works Association

New Jersey Water Environment Association

SELECT PROJECT EXPERIENCE

SBRSA River Road WWTP UV Disinfection and Effluent Filtration Project, Contract 19-2, Stony Brook Regional Sewerage Authority, Princeton Township, NJ

Technical Manager aided in internal design technical review and construction of five (5) disc filters and open channel UV disinfection system to comply with new effluent limitations for the disinfection byproducts Chlorodibromomethane (CDBM) and Bromodichloromethane (BDCM), and replacement the existing mixed sand media effluent filters. Both systems were designed for River Road plant's permitted annual average flow of 13 MGD, max monthly flow of 22 MGD, and max daily flow of 48.2 MGD. A new split-face block and concrete effluent filtration building was constructed to house five, 20 micron, 27'Lx7'Wx8'H stainless steel disc filters with associated operating platforms, 30" to 54" piping and valving, electrical equipment and controls. A new split-face block and concrete building to house UV disinfection system was constructed within two of the existing chlorine contact tanks, creating two channels with low pressure, high intensity angled lamp configuration. Project also included new 70 ft. diameter backwash storage tank mechanism replacement, three 15 Hp, 750 gpm backwash return pumps, FRP launder covers for four 110 ft settling tanks, existing MCC modifications, and miscellaneous civil site upgrades. Provided internal technical review of design, shop drawing submittal review, RFI responses, change order review, on site technical support, and office management for project.

Chester Pump Station Wet Weather Treatment System, Delaware County Regional Water Quality Authority, Chester, PA

Aided in design of Combined Sewer Overflow / Wet Weather treatment facility located at existing Chester Pump Station. The WWTS is sized for 56 MGD flow with new 36-inch motor actuated plug valves diverting additional wet weather flow from existing pump station wet well to new WWTS, helping peak flows at downstream wastewater treatment facility. In general the WWTS process contains two 38 ft diameter vortex type solids separation tanks, influent pump station with three submersible mixed flow pumps each rated at 28 MGD at 25 ft TDH, sodium hypochlorite and sodium bisulfite storage (3,800 gal. & 1,500 gal.) and feed (4.6 gpm & 2.2 gpm) system, three dry pit, submersible, centrifugal underflow pumps each rated at 2,170 gpm at 56 TDH and one dewatering pump rates at 200 gpm at 30 ft TDH. Project also included building expansion of pump station to house new chemical storage and feed system along with new electrical equipment, and a new diesel generator, modifications to existing pump station building, modifications to existing overflow chamber and associated site civil yard piping.

KLEINFELDER
Bright People. Right Solutions.

Michael Nexon, continued

SBRSA Upstream Pennington WWTP Upgrade and Expansion Contract 17-1, Stony Brook Regional Sewerage Authority, Princeton, NJ

Project Engineer who aided in the design and specification of upgrade to Pennington WWTP which has an average daily flow of 0.45 MGD and peak hourly flow of 2.33 MGD. Upgrade consisted of new mechanical rake screen with associated screenings compactor and operating platform, four new vertical shaft centrifugal influent pumps, new influent flow meter chamber, three new 16 ft. diameter primary settling tanks with associated distribution chamber and sludge/ drain valve chambers, added fourth channel to both existing orbal tanks with new aeration disc equipment, two new 40 ft. diameter final settling tanks with associated distribution chamber equipped with PACL dosing point and mixer, new building housing two new disc filters and new UV disinfection, new post aeration tank with additional cascade aeration, new building housing new sludge pump station, new 14 ft. diameter gravity thickener, new 14 ft. diameter sludge storage tank, new WAS meter chamber, modified existing sludge scum chamber, new secondary scum decant chamber, addition of third RAS pump, new chemical building housing PACL storage tank and chemical pumping equipment and odor control biofilter. Prepared mechanical drawings in CADD, coordinated civil yard piping, layout and structural design of structures. Prepared specifications for mechanical process equipment and appurtenances. Assisted with TWA permitting.

Madison Chatham Joint Meeting (MCJM) BPR and Effluent Filter Evaluation, Madison Borough, NJ

Project Engineer aided in the development of evaluation and technical memorandum for MCJM Molitor Water Pollution Control Facility on potential cost effectiveness of implementing biological phosphorus removal (BPR) and feasibility of adding tertiary filtration with disc filters. The plant has a permitted capacity of 3.5 MGD and a max monthly flow of 5 MGD. Evaluated hydraulics, evaluated disc filter units, developed concept drawings, and planning level budgetary cost estimate.

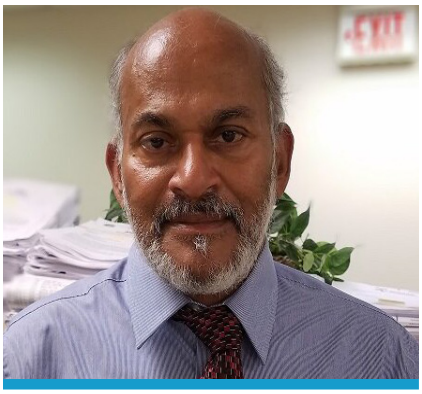
Logan Township MUA Disc Filter and Ultraviolet System, Logan Township, NJ

Project Engineer who aided in the construction administration of the installation of new pre-engineered building containing new channel installed disc filter units with 10 micron pore sizes and ultraviolet disinfection system for Logan Township MUA Wastewater Treatment Plant (4 MGD) in Logan, NJ. Provided shop drawing submittal review, RFI responses, and on site technical support for project.

SRVSA Storm Control Treatment Facility, Somerset Raritan Valley Sewerage Authority, Bridgewater, NJ

Mechanical Process Technical Lead Engineer aided in design and specification of an auxiliary treatment facility rated up to 14 MGD to relieve sanitary sewer overflows which occurred during wet weather events. The facility would divert high flows from Somerville 27-inch sanitary sewer interceptor to relieve Somerville collection system of surcharging. The facility would also have ability to relieve backflow from SRVSA's 54-inch interceptor which surcharges Meter Chamber No. 4. These diversions are done by a new Flow Control Chamber which intersects 27-inch Somerville interceptor just upstream of Meter Chamber No. 4. Flow Control Chamber diverts flow to facility via 30-inch electrical actuated plug valve and 24-inch electrical actuated pinch valve. Diverted flow is conveyed by gravity to facility where flow is treated with mechanical multi-rake screens, then pumped up to 80 ft. diameter primary clarifier, then filtered via ten compressible media filters and then disinfected by horizontal medium pressure lamp UV system. Additional facility appurtenances designed were odor control system, draining and cleaning facility equipment operation, effluent pumping, control gates, etc.

KLEINFELDER
Bright People. Right Solutions.



TUSHAR ROY

Process and Hydraulic Lead

Office Location
Princeton, NJ

Years of Experience
43

Education

Masters, Environmental Engineering, Lehigh University, Pennsylvania, 1989

Bachelors, Chemical Engineering, Jadavpur University, 1976

Professional Affiliations

American Institute of Chemical Engineers

American Water Works Association

Water Environment Federation

International Association of Water Pollution Research & Control

Mr. Roy served as lead process engineer for the alternatives evaluation and design of the NBMUA membrane treatment system for the direct filtration of trickling filter effluent and the current pilot testing of pretreatment alternatives to increase peak flow capacity. He also serves as lead process engineer for the alternatives evaluation and design of the SRVRSA SSO treatment facility incorporating compressible media filters and UV disinfection, as well as for the LCA conceptual design to increase the wet-weather treatment capacity of the Kline's Island Wastewater Treatment lant and its two stage trickling filter process from 87-mgd to 130-mgd in three phases. He also served as lead process engineer during the evaluation of alternatives and design of new disk filters to replace the existing deep bed multi-media filters due to their age and condition and to increase the average flow capacity of the River Road Plant from 13-mgd to 19-mgd. For the Delaware County water quality control authority, Mr. Roy served as lead process engineer to evaluate alternatives to increase wet weather treatment capacity including BioActiflo, Compressible media filters and a vortex separation process. He also developed and lead plot testing pf UV disinfection to evaluate the impact of w ide wide variations in UV transmissivity due to the wide range of trucked-in waste treated at the facility.

SELECT PROJECT EXPERIENCE

Kline's Island Wastewater Treatment Plant Improvements, Allentown, PA
Project engineer for the design and construction of improvements to rehabilitate the primary clarifiers and aerated grit chambers at the 40 MGD Kline's Island wastewater treatment plant in Allentown, Pennsylvania. In a related project, served as Project Engineer for the design of a third aerated grit chamber and screening facility to expand the peak flow capacity to 93 MGD and to receive flow from a new force main to the plant.

Membrane Filtration Pilot Testing, North Bergen Municipal Utilities Authority, NJ
Performed pilot testing of membrane filtration technology to treat trickling filter biological treatment process effluent to comply with Whole Effluent Toxicity (WET) limits for North Bergen Municipal Utilities Authority's Woodcliff WWTP. The pilot test results were subsequently used for the design and construction of the 8.0 MGD peak hydraulic capacity plant improvements.

Woodcliff WWTP Upgrade, North Bergen Municipal Utilities Authority, NJ
Served as principal engineer for the design and engineering of North Bergen Municipal Utilities Authority's 8.0 MGD capacity Woodcliff WWTP upgrade using membrane filtration process for Whole Effluent Toxicity (WET) compliance. Currently, providing construction services for the proposed plant upgrade.

Treatment Process Consulting, Stony Brook Regional Sewerage Authority, NJ
Performed facility planning, design, permitting and construction phase services for the Stony Brook Regional Sewerage Authority in New Jersey over a 25-year period. Currently performing hydraulic analyses, design and engineering to replace existing media filtration and chlorine disinfection systems with new disc filters and low pressure high intensity UV disinfection units.

KLEINFELDER
Bright People. Right Solutions.

Tushar Roy, continued

Pilot Scale Treatability Study, Ewing-Lawrence Sewerage Authority, NJ
Performed pilot scale treatability study at the Ewing-Lawrence Sewerage Authority with the low pressure 1000 watt output (highest output low pressure UV lamp) UV system for disinfection of attached growth (trickling filter) secondary treated effluent in conjunction with and without suspended growth (activated sludge) biological tertiary treatment system for disinfection. This is the only know system which used UV for disinfection of TF effluent. The pilot study results were subsequently incorporated in the final design for the overall plant improvements.

Facilities Planning Study, Ewing-Lawrence Sewerage Authority, NJ
Served as principal engineer for a Facilities Planning Study for the Ewing-Lawrence Sewerage Authority's 16 MGD wastewater treatment plant. This plant utilizes plastic media trickling filters for BOD removal and an activated sludge system for ammonia-nitrogen removal. The key issue addressed included expansion to meet the future capacity needs, upgrade to meet future effluent limitations for nitrate-nitrogen and dichlorobromomethane (DCBM), rehabilitation of aging infrastructure to ensure continued reliable performance, and enhancing energy and operational efficiencies to reduce operational costs. Also served as principal engineer during the fast-tracked design and bidding of Phase 1 Improvements with a construction cost of $22.7 million. These improvements include new UV disinfection and effluent pumping facilities, new preliminary treatment facilities, and replacement of mechanical and electrical systems throughout the plant that have reached the end of their useful service life.

Pump Station Hydraulic Analysis and Design, Ocean County Utility Authority, NJ
Served as a project engineer for hydraulic analyses and design of the Ocean County Utility Authority's NPS-5 pump station, upgrading to a firm capacity of 16.1 MGD. Also served as project engineer during construction.

Central Water Pollution Control Facility Phase II Plant Improvements, Ocean County Utilities Authority, Rahway Valley Sewerage Authority, NJ
Provided ultraviolet disinfection and filtration pilot plant treatability studies, process evaluation, biological process modeling and hydraulic analyses for each of the unit processes including the 72-inch main trunk sewer and 72-inch outfall for the 40 MGD wastewater treatment plant of Rahway Valley Sewerage Authority in New Jersey.

Wastewater Treatment Plant Upgrade, Johnson & Johnson Skillman Facility, NJ
Participated in the process and capacity evaluation, design, and construction of an upgrade to the wastewater treatment plant at Johnson & Johnson's Skillman facility in New Jersey, which consists of sequencing batch biological reactors (SBRs), clarification, filtration, ultraviolet disinfection, and reverse osmosis units for treating plant effluents containing various organic chemicals and SVOC.

Wastewater Treatment Plant Upgrades, Frenchtown Borough, NJ
Provided technical management during design of a $10 million project to replace Frenchtown Borough's wastewater treatment plant with an upgraded and expanded facility to meet the development and re-development needs of the Borough while complying with DRBC's Special Protection Waters Requirements.

KLEINFELDER
Bright People. Right Solutions.

COLIN FERGUSON, PE

Wastewater Treatment Process

Mr. Ferguson is a 37-year veteran with extensive experience in the planning and design of water/ wastewater treatment facilities, pumping stations, sludge and chemical handling facilities, and odor control systems. His experience includes preparation of study and design reports; preparation of detailed plans, specifications, and cost estimates; project management; and construction administration. He is a licensed professional engineer in California and New Jersey and a certified Construction Document Technologist (CDT).

Office Location
Princeton, NJ

Years of Experience
37

Education
Bachelors, Environmental and Earth Science, Rutgers University, 1985

Bachelors, Agricultural Engineering, Rutgers University, 1985

Masters, Environmental Engineering, California State University, Long Beach, California, 1997

Registrations/Certifications
Professional Engineer (PE)-Civil, No. 24GE04893700, NJ

Professional Engineer (PE)-Civil, No. C45677, CA

Professional Affiliations
New Jersey Water Environment Association

SELECT PROJECT EXPERIENCE

Wastewater Treatment Plant Consolidation Preliminary Design, Montgomery Township, NJ
Responsible for the preliminary design of new pumping stations and force mains to convey flow from the Oxbridge and Riverside wastewater treatment plants (WWTPs) to the Pike Brook WWTP, and for evaluation of upgrade requirements for the Pike Brook WWTP to accommodate the additional flows.

Upstream Facility Planning Study, Stony Brook Regional Sewerage Authority, Princeton, NJ
Responsible for evaluation of expansion of the Hopewell and Pennington WWTPs to future build-out flows of 0.37 MGD and 0.45 MGD respectively. The evaluation includes characterization of influent flows and loads, process modeling, and identifying facility upgrades to handle additional flows/loads, replace aging equipment and to meet new nitrate and phosphorous effluent limitations.

Pennington Wastewater Treatment Plant Upgrade and Expansion Project, Stony Brook Regional Sewerage Authority, Pennington, NJ
Project design leader for improvements to expand the Pennington WWTP from 0.3 mgd to 0.45 mgd and to address aging infrastructure and new effluent limits for nitrate, dichlorobromomethane (DCBM) and total phosphorous. Specific improvements included a new mechanically cleaned screen, influent pumps, primary clarifiers, Orbal Tank expansion and aeration system upgrades, polyaluminum chloride (PACL) feed system, secondary clarifiers, disc filters, UV disinfection, post aeration, gravity thickening, sludge storage, upgrades to the electrical distribution system and other miscellaneous improvements.

Wastewater Treatment Plant Facility Plan, Rockaway Valley Regional Sewerage Authority, Boonton, NJ
Responsible for preparation of a facility plan for the RVRSA WWTP to establish the recommended long-term plan and design concept for expanding the plant capacity from 12 mgd to 15 mgd, and finalizing design concepts to address phosphorous effluent limits, effluent filtration, aging infrastructure and upgrading the service water system.

KLEINFELDER
Bright People. Right Solutions.

Colin Ferguson, continued

Wastewater Collection System, Town of Waterford, CT
Responsible for an evaluation of the town's wastewater collection system infrastructure which includes over 140 miles of sewers and force mains and 26 pumping stations. The evaluation included identifying recommended upgrade requirements for 2 pump stations, an infiltration and inflow study, a SCADA evaluation, recommendations for minimizing odors, a staffing study, and preparation of a capital improvement plan.

Rehabilitation of Oxygenation Tanks, Passaic Valley Sewerage Commissioners, Newark, NJ
Responsible for design of improvements to a 330 MGD high-purity oxygenation system. Project included replacement of existing submerged turbine mixers with mechanical surface aerators with upper and lower impellers and rehabilitation of purge blowers and electrical system improvements.

Wastewater Treatment Plant Design, Boehringer Ingelheim Chemicals, Inc., Peterburg, VA
Project included a membrane bioreactor system (MBR) to treat up to 330,000 gallons per day of process wastewater from a pharmaceutical production facility. Responsibilities included preparing MBR equipment prepurchase specifications, evaluating vendor proposals, life cycle cost analysis and shop drawing submittals, and design of a wastewater cooling system.

Wastewater Treatment Plant Design, Confidential Client, PA
Design quality leader for a new wastewater treatment facility for a fruit processing facility. Responsibilities included evaluation of aerobic and anaerobic/aerobic membrane bioreactor technologies, preparing pilot study work plans, design of influent screening, pumping, equalization, effluent pumping and re-aeration systems, site layout design and influent/outfall piping, and evaluation of package treatment systems for handling domestic wastewater flows.

Sludge Handling Facility Improvements, Bergen County Utilities Authority, Little Ferry, NJ
Responsible for the design of new sludge thickening and dewatering facilities to handle sludge generation at the BCUA wastewater treatment facility. Facilities include gravity belt thickeners for thickening waste activated sludge, and combination gravity belt thickener/belt filter presses to thicken or dewater digested sludge. Also responsible for conducting a Polymer Study as part of this project to evaluate polymer uses throughout the plant, and to evaluate the merits of a centralized polymer facility.

KLEINFELDER
Bright People. Right Solutions.

PAM WESTGATE, PE

Wastewater Treatment Process

Ms. Westgate has 31 years of experience and has been involved with engineering projects since 2007. She skillfully assists municipalities in meeting permit requirements at their wastewater treatment facilities. She has extensive experience evaluating processes and developing the right solutions. She has extensive experience, including condition and needs assessments, feasibility and alternatives assessments, and design, bidding, and construction engineering services. Ms. Westgate works collaboratively with clients to find the best solutions for their individual needs.

Office Location
Springfield, MA

Years of Experience
31

Education

Bachelors, Ecology, Hampshire College, Massachusetts, 1991

Masters, Biology, University of Massachusetts at Amherst, 2001

Masters, Environmental Engineering, University of Massachusetts at Amherst, 2009

Registrations/Certifications

Professional Engineer (PE)-Civil, No. 51797, MA

Professional Affiliations

American Society of Civil Engineers

Water Environment Federation

New England Water Environment Association, Operations Committee

New England Water Works Association

SELECT PROJECT EXPERIENCE

Pittsfield WWTP Facilities Plan and Upgrade, City of Pittsfield, MA
Senior project engineer for development of the WWTP Facilities Plan to layout improvement/upgrade plans balancing repair and replacement needs of aging equipment and process upgrade requirements for regulatory compliance. The final design team developed construction documents for $65 million of Nutrient Removal Upgrade for City's 17 MGD WWTP, to achieve compliance with the City's NPDES permit and EPA Administrative Order that contains stringent limits for Total Phosphorus Limit (0.1 mg/l) as well as nitrogen loading requirements. The WWTP Upgrade consists of a new Ballasted Flocculation process (CoMag), Nitrogen Removal Upgrade, Secondary Clarifiers Upgrade, Solid Handling Upgrade and other ancillary plant-wide improvements. Upon completion of the WWTP Upgrade, the CoMag Ballasted Flocculation process will be the largest installation in the United States.

Springfield Regional Wastewater Treatment Facility (SRWTF) Facility Plan & Improvement Tasks under CSO Program Management Task Orders, Springfield Water and Sewer Commission (SWSC), Springfield, MA
Senior project engineer for treatment plant condition and treatment capacity assessments and nutrient removal performance. Evaluated improvement needs at SRWTF for implementation of CSO Long-term Control Plan and Comprehensive Wastewater Management Plan. The facility is a 67 MGD (180 MGD peak flow capacity) biological nutrient removal plant. Other completed tasks include: Plant Capacity Assessment of SRWTF wet weather flow treatment capacity and development and evaluation of improvement alternatives for future permit compliance as well as developed standard operation procedures for process performance improvement and a high flow management plan. Including a comprehensive assessment of final clarifiers with a state point analysis, stress testes, dye dispersion test, and computational fluid dynamic (CFD) model evaluation. Biological Nutrient Removal (BNR) Assessment of SRWTF's existing BNR performance and evaluated alternatives to meet future needs and compliance of future nitrogen limit. Including development and calibration of a biological process model, Facilities Plan Update to reassess $150 million of a 20 year capital investment plan (CIP) and recommend near-term (5 year) CIP project for a design-build-operate (DBO) project.

KLEINFELDER
Bright People. Right Solutions.

Pam Westgate, continued

Wastewater Treatment Plant (WWTP) On-Call Contract, City of Northampton, MA

The Northampton WWTP is subject to the EPA Chemical Accident Prevention Regulations (40 CFR 68), which require a Risk Management Plan (RMP). As part of an on-call contract with the City of Northampton, Ms. Westgate assisted with reviewing conditions, processes and materials storage at the WWTP and updated the RMP as necessary. She also assisted in the required compliance audit of the WWTP and updated the Process Hazard Analysis for chlorine gas.

Wastewater Facilities Planning and NPDES Permit Compliance, Borough of Naugatuck, CT

Project engineer for evaluation of the Naugatuck Wastewater Treatment Facility (WWTF) and collection system. Kleinfelder led a team of engineers in evaluating the condition of the WWTF and pump stations, and assessed the condition and capacity of WWTF processes. An Inflow and Infiltration (I/I) evaluation followed by a sewer system elimination survey (SSES) in the collection system were completed to determine the optimum locations for capital projects aimed at reducing I/I. Ms. Westgate is the author of the Facilities plan, the Pump Station Evaluation, the SSES Report, and has conducted a preliminary rate study for Naugatuck.

Field's Point Wastewater Treatment Facility (WWTF) Upgrade, Narragansett Bay Commission, Providence, RI

Ms. Westgate was the editor for the Operations and Maintenance Manual at the Field's Point WWTF, which underwent a $60 million upgrade of its wastewater treatment process and administration and operations buildings. The WWTF is the largest in the world to employ the Integrated Fixed Film Activated Sludge (IFAS) wastewater treatment process for nitrogen removal, reducing nitrogen effluent concentrations to 5 mg/l or less. The ten aeration basins are segmented into seven zones to facilitate the IFAS process. Additional upgraded facilities include: four new aeration blowers; four new screw pumps; an intermediate screening building; a methanol feed building: a new LEED Certified operations building; improvements to grit handling and scum concentrator facilities; and replacement of mechanical equipment in 13 clarifiers. Ms. Westgate edited and coordinated the submission and review of new and updated Operations and Maintenance (O&M) material from a multi-firm, multi-discipline team. The material updated included everything from process design to existing equipment to emergency response and spill control procedures. Ms. Westgate also coordinated the development, population, and delivery of an O&M manual website that can be easily edited by approved users. Ms. Westgate conducted trainings for WWTP operators and supervisors in the use and editing (for supervisors) of the O&M Manual Website.

Nutrient Upgrade Construction Services, City of Pittsfield, MA

Senior project engineer for evaluation and design of nutrient upgrade at the 17 MGD Pittsfield, MA WWTP. Nutrient upgrade consists of a new tertiary treatment facility to remove phosphorus to below 0.1 mg/L with the Co-Mag ballasted flocculation process; new sludge dewatering equipment; replacement of all secondary clarifier mechanisms, weirs, and influent gates; and modification of the biological secondary treatment process. The trickling filters will be converted to wet weather holding tanks and the secondary process converted to the LE process.

KLEINFELDER
Bright People. Right Solutions.

Office Location
Rocky Hill, CT

Years of Experience
17

Education
Bachelors, Civil Engineering, Instituto Techologico de Santo Domingo, 2004

Masters, Civil Engineering, University of Cantabria, 2007

PhD, Civil Engineering, City College of New York, 2015

Registrations/Certifications
Professional Engineer (PE), No. 97982, NY

Professional Engineer (PE), No. 051988, NC

Professional Engineer (PE), No. PEN.0035170, CT

Professional Engineer (PE), No. 57568, MA

Professional Affiliations
Connecticut Society of Civil Engineers

Water Environment Federation

New York Water Environment Association

New England Water Environment Association

KLEINFELDER
Bright People. Right Solutions.

JOSE INFANTE CORONA, PHD, PE

Wastewater Treatment Process

Mr. Infante Corona is a civil engineer with 17 years of experience specialized in the planning, design, and construction management of site development & civil engineering projects, including hydrological analysis of small to large size watersheds, as well as design and construction of water, stormwater and wastewater infrastructure. Mr. Infante Corona has advanced knowledge in hydrological modeling focused on watershed management and planning, design of separate and combined storm sewer systems and sanitary sewer systems, water supply systems, and storm water management. Mr. Infante Corona's water resources projects include creation, calibration and improvement of hydrological models and the design, construction and management of wastewater and stormwater infrastructure.

SELECT PROJECT EXPERIENCE

North Brookfield Wastewater Treatment Plant Upgrade, Town of North Brookfield, North Brookfield, MA
Mr. Infante Corona was part of the design team for a major upgrade of the North Brookfield Wastewater Treatment Plant. Mr. Infante Corona was the design engineer of the new aeration system and mixing system for the secondary treatment of the plant, this included new blowers selection, diffused air aeration grid design, air flow control system, and the compressed air mixing system for anaerobic and anoxic zones.

Mill River Trunk Sewer Phase II Sanitary Sewer Evaluation Survey, Greater New Haven Water Pollution Control Authority (GNHWPCA), Hamden, CT
Project engineer in charge of field activities coordination, data gathering and analysis, and report writing for the Sanitary Sewer Evaluation Survey (SSES) in the Town of Hamden, CT. The investigation included the evaluation of 76,000 feet of sewers and 400 Manholes for the Mill River Sewer Trunk.

Springfield Regional Wastewater Treatment Facility New Grit Removal System Basis of Design Report, Springfield, MA
Mr. Infante Corona was the project engineer in charge of preliminary asset condition assessment, evaluation of available grit removal technologies, cost analysis, and alternatives analysis of the new grit removal system to be installed at the facility. Developed the basis of design parameters for the final design based on the data collected for grit characterization, research of technologies and flow historical data of the facility. Mr. Infante Corona was also the main author of the basis of design report.

Comprehensive Wastewater Management Plan (CWMP), City of Pittsfield, MA
Project engineer in the development of the Pittsfield, MA Comprehensive Wastewater Management Plan (CWMP). Mr. Infante Corona worked in the assessment of the condition and needs of their wastewater infrastructure, and recommendations for prioritization of needed capital projects. Mr. Infante Corona evaluated the condition and capacity of the WWTF, worked in the development of cost estimates and recommendations and was one of the authors of the CWMP Report.

Jose Infante Corona, continued

WWTP Nutrient Removal Upgrade, City of Pittsfield, MA
Mr. Infante Corona worked as a resident engineer and design engineer during the construction phase of this project. The construction involved upgrades to existing Humus and Aeration Tanks, Secondary Clarifiers, Trickling Filters, and Sludge Dewatering processes, as well as construction of a new tertiary treatment process for chemical phosphorous elimination.

Rose Park Wastewater Pump Station Capacity Upgrade, City of Pittsfield, MA
Mr. Infante Corona performed the peer review of the new pump's design. The new system consisted of submersible pumps in an existing pump station to increase capacity.

Borough of Naugatuck WWTF Exit Evaluation Report, Naugatuck, CT
Mr. Infante Corona performed the WWTF's assets (systems and equipment) evaluation according to the Client's specific protocol, reviewed the information provided by the Contractor for compliance with contract requirements and was one of the lead authors of the final condition assessment report presented to the Borough.

East End Wastewater Treatment Facility Primary Sludge Gallery Upgrade, Portland Water District, Portland, ME
Mr. Infante Corona was the process engineer in charge of the assets assessment, alternatives analysis and final design for the primary sludge gallery upgrades that included the primary sludge pumps replacement, plant water pumps replacement, gravity thickener rehabilitation, addition of new dilution/fluidizing water at the sludge handling facilities and miscellaneous pipes and valves replacement/ rehabilitation at the primary sludge handling facilities of the Portland, ME East End Wastewater Treatment Facility. Mr. Infante Corona also coordinated the design with other disciplines involved (Electrical, HVAC, Structural, Architectural and Instrumentations/Controls) and was the lead author if the preliminary and final design report.

Plymouth Wastewater Treatment Plant Nutrient Control, Town of Plymouth, MA
Mr. Infante Corona analyzed the pilot plant operational data, including total nitrogen, ammonia, nitrates, nitrites, dissolved oxygen and blower's electrical power data from a network of sensors installed at the secondary biological batch reactors of the Plymouth Wastewater Treatment Plant. The objective was to determine and quantify system reliability, potential power reduction, and operational implications of an ammonia-based aeration control (ABAC) for a batch reactor system. The results showed that, if changes were to be permanently implemented as piloted, there could be potential energy reduction of 28%, for a total savings of $42,000 per year, without hindering the process performance and with minimal operational changes.

Design of Wastewater Treatment Plant of Playa Nueva Romana, INICA SRL, La Romana, Dominican Republic
Mr. Infante Corona was the design engineer for the biological treatment system for all domestic wastewater from Urban/Touristic complex. Design daily peak flow of 3.5-MGD and hourly peak flow of 7.0-MGD. The design included equalization tanks, oil/grit separator tanks, diffused air aeration activated sludge system, settling tanks, and chlorine disinfection system.

KLEINFELDER
Bright People. Right Solutions.

JAMES BEIDEMAN, PE

Geotechnical Lead

Mr. Beideman has experience as a geotechnical engineer involved in a variety of geotechnical and geoenvironmental projects that include planning and execution of subsurface explorations, geotechnical report preparation, regularity compliance, and foundation investigations. In addition to design support, Mr. Beideman has worked on a variety of construction projects including, slurry wall construction, soil management, tieback installation, wood pile underpinning, slurry caisson installation, and drilled micropile installation.

Office Location

Exton, PA

Years of Experience

23

Education

Bachelors, Geological Geophysical Engineering, Colorado School of Mines, Colorado, 2000

Masters, Civil Engineering, Northeastern University, Massachusetts, 2004

Registrations/Certifications

Professional Engineer (PE)-Civil, No. 24GEO4693500, NJ

Professional Engineer (PE)-Civil, No. 46048, MA

Professional Engineer (PE)-Civil, No. PE073129, PA

Professional Engineer (PE)-Civil, No. 14578, DE

Professional Engineer (PE)-Civil, No. 36307, MD

Professional Engineer (PE)-Civil, No. 20038, WV

Professional Engineer (PE)-Civil, No. 77525, OH

Professional Engineer (PE)-Civil, No. 402052489, VA

Professional Engineer (PE)-Civil, No. 093479, NY

40-Hour HAZWOPER, OSHA

KLEINFELDER
Bright People. Right Solutions.

SELECT PROJECT EXPERIENCE

Trenchless Designs for PECO Accelerated Gas Infrastructure Modernization Project Program, Philadelphia, Pennsylvania

Project Manager and geotechnical engineer responsible for development of design packages for trenchless crossings. Designs include jack and bores and well as horizontal directional drills (HDD) to avoid existing infrastructure and environmental impacts. The scope of work included geotechnical investigation, site survey, and civil design including inadvertent return and pipe stress analysis for HDDs. The project involved coordination between townships, PECO, PennDOT and pipeline contractors to develop innovative solutions.

USCG Brewerton Channel Range Site, Baltimore, Maryland

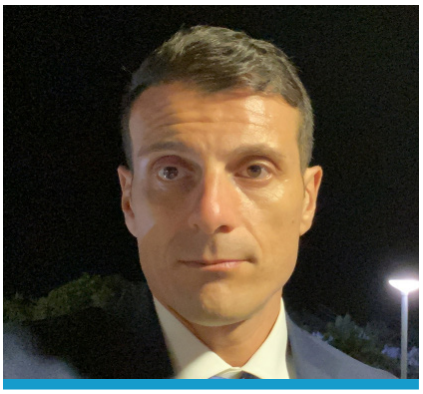
Provided geotechnical engineering services for the coordination, execution, and data summary for a geotechnical investigation to support the design and construction of a range tower site in Baltimore Harbor, Baltimore, Maryland. The project was completed for the United States Coast Guard and consisted of two test borings, one land and one water based, to provided geotechnical soil properties for pile design. Lab testing consisted of unconfined undrained (UU) compression tests, Atterberg Limits, grain size analysis and moisture contents.

James Compressor Facility – Doddridge County, West Virginia

Project Engineer responsible for the coordination, execution, data evaluation, and reporting for a geotechnical investigation to support the design and construction of a shale gas compressor pad facility. Analysis and calculations were performed to provide recommendations for site grading, shallow foundations and seepage control. Provided quality control oversight for construction inspection including field density testing and subgrade observation.

Pennsylvania Department of Environmental Protection (PADEP), Certification for Cheltenham Earthen Levee, Commonwealth of Pennsylvania

Provided geotechnical engineering services for FEMA's transition to the Digital Flood Insurance Rate Map system. Mr. Beideman evaluated over 40 flood protection systems (FPS) that are comprised of earthen levees, concrete floodwalls, and various types of closure structures. Mr. Beideman performed an initial Phase 1 file review and an assessment of available data to determine the likelihood that a levee will meet the requirements for Certification for Cheltenham Earthen Levee. A field inspection was also performed according to USACE protocols, including evaluation of levee maintenance, condition of concrete floodwalls, observations of encroachments, animal burrows, vegetation, and evidence of erosion, settlement, seepage, piping, sloughs, or other forms of instability.



MAX ROLANDI, PHD, PE

Geotechnical

Dr. Rolandi is a geotechnical engineer with 14 years of experience. He has worked on a variety of projects that include private residential, commercial and mixed-use developments, municipal and industrial facilities, pipelines, dams/levees and bridges. Dr. Rolandi's experience includes geotechnical site characterization, geotechnical data analysis, geotechnical design of shallow and deep foundation systems, ground improvement, support of excavation, earth retaining structures, earthquake engineering, slope stability and construction administration.

Office Location
Boston, MA

Years of Experience
14

Education

Bachelors, Environmental Engineering, University of Naples, Federico II, Naples, Italy, 2005

Doctorate, Engineering Geology and Geotechnics, University of Naples, Federico II, Naples, Italy, 2011

Masters, Geotechnical Engineering, Virginia Polytechnic Inst. & State University, blacksburg, 2009

Registrations/Certifications

Professional Engineer (PE)-Geological, No. 50928, MA

Professional Engineer (PE)-Geological, No. PE17312, ME

Professional Engineer (PE)-Civil, No. PEN36384, CT

40-Hour HAZWOPER, OSHA

10-Hr Construction Safety and Health, No. 36-004912032, OSHA

Professional Affiliations

Geo-Institute

Boston Society of Civil Engineers

American Society of Civil Engineers

KLEINFELDER
Bright People. Right Solutions.

SELECT PROJECT EXPERIENCE

Saco Wastewater Treatment Facility (WWTF) Resiliency Improvements, Saco, ME

Dr. Rolandi was the geotechnical engineer lead on this project. He provided geotechnical engineering support during the budgeting and preliminary design of the project. The proposed improvements included several new buildings and tanks as well as a new sheetpile wall and raise in grade to increase the facility flood resiliency. The subsurface conditions at the site consisted of granular fill over medium stiff to soft clay, glacial till and bedrock. Dr. Rolandi coordinated the subsurface investigation program and prepared the geotechnical engineering report including seismic and preliminary deep foundation recommendations for this project.

CSO Modification, Town of Kingston, NY

Dr. Rolandi was the geotechnical engineer lead on this project. He provided geotechnical engineering support during the budgeting and preliminary and final design of the project. The proposed improvements included the modification of the existing CSO with the addition of a new 28-inch pipeline from the CSO into the existing Rondout Creek. The subsurface conditions at the site consisted of fill over soft clay, glacial till and bedrock. The new pipeline extension was proposed to be supported on driven piles. Dr. Rolandi coordinated the subsurface investigation program, performed driven pile geotechnical design and coordinated peer review of the geotechnical calculations with the third-party Client consultant. He also prepared the geotechnical engineering report and the geotechnical contract specifications for this project.

MIS Diversion Structure, Springfield Water and Sewer Commission (SWSC), Springfield, MA

Dr. Rolandi was the geotechnical engineer lead on this project. He provided geotechnical engineering support during 60 percent and final design of this project. The proposed project included the construction of a new diversion structure for the existing 78-inch MIS pipe. The subsurface conditions at the site consisted of fill, overlaying coarse and fine-grained deposits, glacial till and bedrock. The MIS diversion structure was proposed to be funded on drilled micropiles. Dr. Rolandi performed drilled micropile design, prepared the geotechnical contract specifications and provided support through final design.

BRAD THOMAS, PE

Electrical/I&C

As Department Manager and Team Leader for the Integrated Facilities Design Division, Mr. Thomas monitors budgets and schedules and assists with preparation of plans and specifications for construction of commercial, industrial, and governmental buildings, water and wastewater treatment plants, as well as other structures for new construction projects and renovation work. In addition, Mr. Thomas keeps in close contact with clients and assists in preparation of project proposals. Prior to joining the firm in 1996, Mr. Thomas had extensive structural engineering experience in the steel fabrication industry as a design engineer with a steel joist manufacturer and as sales manager with a structural steel fabricator.

Office Location
Bowling Green, OH

Years of Experience
34

Education
Bachelors, Civil Engineering, Ohio State University, Columbus, Ohio, 1989

Registrations/Certifications
Professional Engineer (PE)-Civil, No. 6201069624, MI

Professional Engineer (PE)-Civil, No. 042432, NC

Professional Engineer (PE)-Civil, No. 11513660-2202, UT

Professional Engineer (PE)-Civil, No. 76174, OH

Professional Engineer (PE)-Civil, No. 0402056973, VA

SELECT PROJECT EXPERIENCE

Penta Career Education Facility, Penta Career Center, Bowling Green, OH
Project Structural Engineer for the design of the new educational building that includes a regulation storm shelter as part of the building, sufficient to protect the normal number of individuals that occupy the building against a tornado event.

Arts and Health Technologies Center, Terra Community College, Fremont, OH
Project Structural Engineer for the 32,000 sq. ft. renovated space that included Smart classrooms, as well as patient and model laboratories, patient rooms, and physical therapy rooms for the college's new and existing allied health programs. It also provided upgraded space for Terra's music and fine arts programs, including a multi-purpose performance room, practice areas and studio space. Gallery corridors and a central common area were designed to inspire creativity and promote a community atmosphere.

Allied Health & Public Service Building & Renovations, Northwest State Community College, Archbold, OH
Project Management Lead for the design of a new 20,000 sq. ft. building that houses the College's nursing program, including classrooms, nursing lab and faculty offices. The project included extensive renovation of a second floor of an existing building.

Founders Hall Renovations, Owens Community College, Toledo, OH
Structural Engineer for Owens' adaptive reuse of the Penta Administration Building into a new School of Humanities, including classrooms, conference and meeting rooms, gathering areas and a cyber cafe. Kleinfelder worked with an architectural subconsultant to develop plans for the 28,000 sq. ft. renovation in a fast-track eight-week time period in order for the facility to be ready for use in time for the spring semester.

Tuscarawas Eugene Tolloty Technology Center Incubator, Kent State University, New Philadelphia, OH
Project Structural Engineer for the design of a 25,000 sq. ft. business/technology incubator which included approximately 15,000 sq. ft. of office, conference and laboratory spaces. The focus of the incubator was to provide start-up space to high-tech companies involved in research and development.

KLEINFELDER
Bright People. Right Solutions.

CHARLES SCHUYLER MOREHOUSE, PE
President and Principal
MOREHOUSE ENGINEERING, INC.
President: Morehouse Engineering, Inc.
P.O. Box 205, 43 Railroad Place.
Hopewell, New Jersey 08525

REGISTERED PROFESSIONAL ENGINEER:

New Jersey, California, New York, Pennsylvania, Maryland, Delaware, Florida

GENERAL BACKGROUND:

Mr. Morehouse, President of Morehouse Engineering, Inc., has been involved in the design and construction of heavy industrial and process facilities within the manufacturing, water, wastewater, pharmaceutical, chemical, petrochemical, and mining industries during the past 44 years. The constructed values of these facilities were in the range of **$800,000 to $347,000,000**.

He has been employed by Chevron (1978), Bechtel (79 through 87) and Metcalf and Eddy (87 through 90). In 1990 he founded his own firm. Morehouse Engineering, Inc. carries 14 employees.

He is experienced in the design and construction of 16 major wastewater treatment plant upgrades and 5 major water treatment plant upgrades not including the many minor upgrades, liquid and solids handling process units from pharmaceutical, chemical, petrochemical, and solvent extraction/electrowinning to asphalt membrane manufacturing; specializing in the design and implementation of fully automated continuous and batch systems. This experience includes the design of high viscosity, high corrosion, and high temperature liquid pipe and pumping systems, development of operational functional descriptions for process units in preparation for system programmable logic controller programmers, vessel design, electrical system design, and specifying control valves and field mounted instruments.

With years of experience of both designing and constructing wastewater and water treatment facilities, he is able to appreciate and understand the costs related to the design decisions for mechanical, control, instrumentation and electrical systems. With this experience and direct working knowledge of project implementation, he is able to evaluate the cost relative to the true benefits of the design decisions.

His experience also includes the design, troubleshooting and evaluation of electrical power and control systems for process plants, pumping stations, and alternate energy applications.

EDUCATION:

BS: Mechanical Engineering, University of Pennsylvania, 1979

PROFESSIONAL MEMBERSHIPS:

International Society of Automation
American Institute of Chemical Engineers
American Society of Mechanical Engineers
National Society of Professional Engineers
Association of Electrical Engineers
Association of Energy Engineers
Professional Engineers in Private Practice
Association of Environmental Authorities
Water Pollution Control Federation

ERIC BUFFINGTON, AIA, LEED AP

Architectural

Mr. Buffington is a senior architect with 27 years of experience in a wide variety of design projects including transportation stations, maintenance facilities, water/wastewater treatment plants, commercial interiors and other public properties. In recent years, Mr. Buffington's experience has focused on transportation stations and water/wastewater projects for municipalities. His experience encompasses the production of design and construction documents, the coordination of consultant work and the supervision of work groups. In addition, he is responsible for the assessment of project compliance with regulatory codes and the performance of construction administration activities including site observation, shop drawing review and interfacing with contractors. His interaction with all disciplines on these multi-million dollar projects ensures high quality and meets client budget and schedule constraints.

Office Location
Boston, MA

Years of Experience
27

Education
Bachelors, Architecture, Wentworth Institute of Technology, Massachusetts, 1996

Registrations/Certifications
Registered Architect, No. ARC5250, ME

Registered Architect, No. 05008, NH

Registered Architect, No. 5457, RI

Registered Architect, No. 50438, MA

Registered Architect, No. AIA 38254500

Registered Architect-NCARB Certification, No. 74024

LEED Accredited Professional

Professional Affiliations
American Institute of Architects

Boston Society of Architects

National Council of Architectural Registration Boards, Council

SELECT PROJECT EXPERIENCE

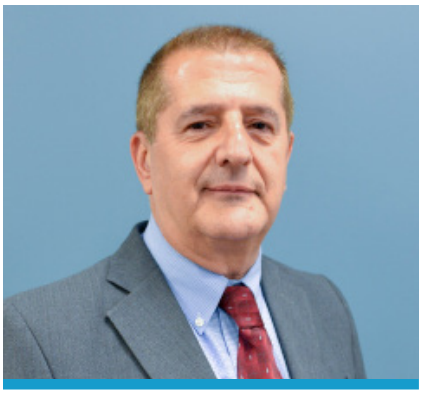
Wastewater Treatment Plant (WWTP) Nutrient Removal Upgrade, City of Pittsfield, MA
Mr. Buffington serves as the lead project architect on facility condition assessments for the Town's wastewater treatment plant which included conducting site visits for documentation and assessment of 15 buildings and structures totaling 72,874 sq. ft. The project team provided objective, analytical findings and recommendations in narrative report format.

Indian Orchard Pump Station and Interceptor Improvements Project, Springfield Water and Sewer Commission (SWSC), Springfield, MA
Mr. Buffington served as the designer and developed design documents for the renovation of an addition to a large pump station in Springfield, MA. Modifications to the existing Indian Orchard Pump Station included increasing the original pump station flow capacity from 38 MGD to 52.5 MGD. The peak flow rate of 52.5 MGD was a critical component of the overall CSO reduction program.

Wastewater Facilities Audit, Town of Plymouth, MA
Mr. Buffington served as the lead project architect on facility condition assessments for the town's wastewater treatment plant and five of its wastewater pumping stations. The project entailed conducting site visits for documentation and assessment of buildings and structures totaling 25,842 sq. ft. The project team provided objective, analytical findings and recommendations in narrative report format. The evaluation included an overall risk matrix of the wastewater facilities and further addressed the deficiencies observed.

Brown's Crossing Wellfield Rehabilitation, Town of Wilmington, MA
Mr. Buffington was lead project architect, collaborating with the Town Superintendent, on renovations and improvements for the aging Brown's Crossing pump station building originally constructed in 1928. The project entailed evaluating conditions and recommending improvements for this one level pumping station totaling approximately 1,000 sq. ft. Building code assessment, design and construction documents, and construction administration services were provided for this $1,103,768.00 construction project.

KLEINFELDER
Bright People. Right Solutions.



RAFIC KHALIL, PE

Structural

Mr. Khalil has 34 years of diversified structural engineering and project management experience focusing on bridge and transportation projects in design, rehabilitation and rating of basic to complex steel, concrete and timber bridges, including historic bridges and concrete and masonry arches. Mr. Khalil's experience includes management and design of various Transportation, Infrastructure, Environmental, Water/Wastewater, Parks, and Site projects and structures including construction administration services, for municipal, private, public, and state clients.

Office Location
Boston, MA

Years of Experience
34

Education
Bachelors, Civil Engineering, Merrimack College, 1982

Masters, Civil Engineering, University of Massachusetts Lowell, 1985

Registrations/Certifications
Professional Engineer (PE)-Structural, No. 10725, NH

Professional Engineer (PE)-Structural, No. 39125, MA

Professional Affiliations
American Society of Civil Engineers

Boston Society of Civil Engineers

ASCE - New Hampshire Chapter

SELECT PROJECT EXPERIENCE

NBC Phase III CSO Consolidation Conduit Final Design - IIIA6 OF-218 Facilities, Narragansett Bay Commission (NBC), Pawtucket, RI

The objective of Project IIIA-6 is to provide flow surcharging relief to the lower Blackstone Valley Interceptor (BVI) and to convey CSOs from Outfall-218 (OF-218) to the future Pawtucket Tunnel via its associated Drop Shaft 218 (DS-218). Kleinfelder is contracted to perform field investigations, develop 30%, 60%, 90%, and final design documents, and provide permitting support services for the construction of sewer infrastructure improvements including approximately 650 lf of 60-inch reinforced concrete (RC) pipe, 95 lf of 8-feet by 8-feet RC conduit, 30 lf of 8-feet by 10-feet RC conduit, a flow relief structure (LBVI), a flow diversion structure (FCT), and a flow junction structure (GJS). As the senior structural engineer, Mr. Khalil provided supervision, review, constructability assessments and plans for 30% design level. Also, Mr. Khalil supervised and reviewed staff structural engineers and coordinated with other disciplines on the project.

Locust Transfer and Flow Optimization Final Design, Springfield Water and Sewer Commission, Springfield, MA

Mr. Khalil served as lead structural engineer for this project which involves providing final design and bidding services for the implementation of Phase 3 of the SWSC's Long-Term CSO Control Plan. The Locust Transfer project (Phase 3) aims to complete the system redundancy work that began under the York Street Pump Station and River Crossing project (Phase 2). The Locust Transfer project involves the construction of pipeline infrastructure to connect the new Phase 2 river crossings to the Main Intercepting Sewer (MIS), 66-inch RCP and PCCP pipeline that convey the majority of the City's wastewater flows to the Springfield Regional Wastewater Treatment Facility across the Connecticut River, with critical sections and valve structures supported on steel micropile and concrete pile cap foundations. Mr. Khalil provided supervision, review, constructability assessments and plans from preliminary to final design. Also, Mr. Khalil supervised and reviewed staff structural engineers and coordinated with other disciplines on the project.

KLEINFELDER
Bright People. Right Solutions.