BOARD OF THE METROPOLITAN SEWERAGE DISTRICT
May 17, 2023

1. Call to Order and Roll Call:

The regular monthly meeting of the Metropolitan Sewerage District Board was held in the Boardroom of MSD's Administration Building at 2:00 pm, Wednesday, May 17, 2023. Chairman VeHaun presided with the following members present: Ashley, Bryson, Dearth, Franklin, Kelly, Moore, Pelly, Pennington, Whitesides and Wisler. Lapsley, Manheimer and Watts were absent.

Others present were Billy Clarke, General Counsel; Aaron Babson and Mike Parker with Hazen & Sawyer; Brian Goldstein with Woodfin Sanitary Water and Sewer District; Tom Hartye, Hunter Carson, Scott Powell, Darin Prosser, Mike Stamey, Pam Thomas, Ken Stines, Spencer Nay and Pam Nolan, MSD.

2. Inquiry as to Conflict of Interest:

Mr. VeHaun asked if there were any conflicts of interest with the agenda items. No conflicts were reported.

3. Approval of Minutes of the April 19, 2023 Board Meeting:

Mr. VeHaun asked if there were any changes to the Minutes of the April 19, 2023 Board Meeting. Ms. Wisler moved for approval of the minutes as presented. Mr. Kelly seconded the motion. Voice vote in favor of the motion was unanimous.

4. Discussion and Adjustment of Agenda: None.

5. Introduction of Guests:

Mr. VeHaun welcomed Aaron Babson and Mike Parker with Hazen & Sawyer and Brian Goldstein with Woodfin Sanitary Water and Sewer District.

6. Informal Discussion and Public Comment: None.

7. Report of Committees:

a. CIP Committee – April 25, 2023:

In Mr. Watts absence, Mr. Hartye reported that the CIP Committee met on April 25, 2023. This meeting was well attended, and Mr. Carson gave a great presentation regarding the Ten-Year Capital Improvement Program. The FY2023 Construction Budget will be $26.4 Million. The Ten-Year CIP is up to $531 Million. There are a couple of large projects that have moved within the Ten-Year window, in addition to the fact that estimated costs for all of the projects have gone up. The District continues to do upgrades out in the system but there are a lot of new projects at the plant in addition to two large pump stations. CIP Committee recommends

approval of Staff's recommendation of Endorsement of the CIP Budget for FY 23-24 in the total amount of $26,277,933.

b. Personnel Committee – April 27, 2023:

Ms. Bryson reported that the Personnel Committee met on April 27, 2023. Ms. Troughton and Ms. Thomas gave a very interesting and informative presentation on highlights of the MSD Employee's activities and events. Staff statistics included projected health care and cost for the District, MSD insurance charges, health charges for the cost for MSD and salary information. This information is included in the attached Personnel Committee Minutes. Personnel Committee recommends accepting Staff's recommendation.

c. Finance Committee – May 2, 2023:

Mr. Kelly reported that the Finance Committee met on May 2, 2023. Mr. Powell presented information included in the attached Finance Committee Minutes. Finance Committee recommends approval of Staff's recommendation as presented.

8. Report of General Manager:

Mr. Hartye reported that Steve Henry, Facilities Manager at St. Mark's Lutheran Church e-mailed to thank Mitch Metcalf, Dylan Dyer, and Dalton Hyatt.

Mr. Hartye reported that attached is a thank you email from Calvin Owens, Outreach Coordinator for the City of Asheville.

Mr. Hartye reported that the next Regular Board Meeting will be held on June 14th at 2 pm. The May Right of Way Committee Meeting is cancelled. The next Right of Way Committee Meeting will be held on June 28th at 9 am.

9. Consolidated Motion Agenda:

a. Consideration of Engineering Services Contract: Hydroelectric Power Plant Rehabilitation:

Mr. Hartye reported that in 1984 MSD rehabilitated the Hydroelectric Facility and began generating power. Since then, MSD has saved about $300,000 - $600,000 annually and avoided electrical costs running the treatment plant. Due to the facility's age and condition, upgrades and/or rehabilitation is necessary to continue generating power safely, reliably, and efficiently. In accordance with *NCGS 143-64.31*, MSD advertised a Request for Qualifications for a Hydroelectric Facility Conditional Assessment. The study will include the evaluation of all structural and generating components, and a cost/benefit analysis of recommended improvements and this will be incorporated into the 10-year CIP.

Geosyntec was chosen as the most qualified firm and was awarded the project at the October 19, 2022 Board Meeting. Geosyntec had a sub-contractor, American Hydro, who could not perform their duties. Geosyntec tried to substitute another subcontractor. MSD's Selection Committee interviewed that candidate and determined Geosyntec's team was no longer the most qualified for the project. Hatch was originally ranked a close second by the Selection Committee and determined to be the best qualified firm to complete the project. Hatch is a Canadian based, international firm that has provided hydroelectric power engineering services for over 90 years in more than 110 countries and have all of the in-house expertise to complete the proposed conditional assessment. Hatch's proposed Scope of Work mirrors that of Geosyntec's originally approved scope. The proposed FY 23-24 budget for this project is $195,274.00. Staff recommends the District enter into an engineering services contract with Hatch in the amount of $167,200.00, contingent upon review and approval by District Counsel.

b. Consideration of Engineering Services Contract: Biological Treatment Alternatives Evaluation:

Mr. Hartye reported that MSD's main biological treatment system is the Rotating Biological Contactors (RBCs). The RBCs have performed well over the past 35 years, however, due to their age, condition, and obsolescence, as well as future regulatory requirements, the biological treatment process will need to be replaced with new technology capable of meeting ammonia-nitrogen limits and other anticipated nutrient limits. The purpose of this project is to generate a Biological Treatment Alternatives Preliminary Engineering Report (PER) to include a phased plan for Water Reclamation Facility (WRF) upgrades necessary to meet future regulatory requirements. The near-term objective is to meet the future ammonia-nitrate limits by October 1, 2030. The long-term objective would be to design improvements with the potential to upgrade to more extensive Biological Nutrient Removal (BNR) if that should ever be required. In accordance with *NCGS 143-64.31* the District advertised a Request for Qualifications and received responses from Black & Veatch, Garver, Hazen & Sawyer and HDR. Each firm was invited to interview in front of MSD's Selection Committee and discussed their qualifications and methodology for approaching this project. All firms possessed competent staff and gave excellent presentations. After careful review and consideration of each firm's capabilities, experience and staffing, the Selection Committee selected Hazen & Sawyer as the most qualified. Hazen & Sawyer has extensive experience with similar biological treatment studies and excellent understanding of the challenges this project presents for MSD's WRF. They have performed well on past projects for MSD. Hazen & Sawyer's Scope of Work is attached to this package. The proposed FY 23-24 budget for this project is $600,000.00. This project will span two fiscal years, so a Capital Project Ordinance is required. Staff recommends the District enter into an engineering contract with Hazen &

Sawyer in the amount of $512,952.00, subject to final review and approval by District Counsel.

c. Consideration of Developer Constructed Sewer Systems – Terraces at Reynolds Mountain Ph. 4:

Mr. Hartye reported that the Terraces at Reynolds Mountain Phase 4 project is located off Senator Reynolds Road in the Town of Woodfin and included extending approximately 165 linear feet of 8-inch public gravity sewer to serve 10 townhomes in this phase of the residential development.

Staff recommends acceptance of the aforementioned developer constructed sewer system. All MSD requirements have been met.

d. Consideration of Auditing Services FY 2023:

Mr. Powell reported that at the April Board Meeting, this Board approved Cherry Bekaert, LLP as auditors for this fiscal year. an RFP for Auditing Services was sent to five auditing firms. The fee for the FY 23-24 engagement is $45,000.00 which is below the budgeted amount of $49,000.00. For perspective, the FY 2016 engagement amount was $45,000.00 as well. Staff recommends approval of the FY 23-24 audit contract with Cherry Bekaert, LLC, subject to review and approval by District Counsel.

e. Consideration of Budget Amendment for Debt Service:

Mr. Powell reported that in FY 2023, the Board approved $8.9 Million in debt service. This amount should have been $9.7 Million. Staff mistakenly used the District's debt covenant calculation for debt service as opposed to actual debt service for the fiscal year. As such, Staff recommends amending the Debt Service Fund in the amount of $800,000.00.

f. Cash Commitment Investment Report – Month ended March, 2023:

Mr. Powell reported that Page 150 presents the makeup of the District's Investment Portfolio. There has been no change in the makeup of the portfolio from the prior month. Page 151 presents the MSD Investment Manager's report as of the month of March. The weighted average maturity of the investment portfolio is 95 days and the yield to maturity is 4.62%. Page 152 presents the District's Analysis of Cash Receipts. Monthly and YTD domestic and industrial sewer revenue are considered reasonable based on timing of cash receipts in their respective fiscal periods. YTD facility and tap fees are above historical trends due to the timing of various cash receipts from developers as well as these fees being budgeted conservatively. Page 153 presents the Districts analysis of expenditures. Monthly and YTD expenditures are considered reasonable based on historical trends. Due to the nature of the variable rate bond

market, monthly and YTD expenditures can vary year to year. Based on the current outstanding capital projects, YTD Capital Project expenditures are considered reasonable. Page 154 presents the District's Variable Debt Service Report. The 2008A Series Bonds are performing at budgeted expectations. As of the end of March, the issue has saved the District rate payers over $7.4 million in debt service since April of 2008. Mr. Kelly asked if the District had to refinance today, would the rate likely be 4.85%. Mr. Powell stated that he thought it would be a little lower, around 4%. When we floated the bonds in 2008, that's when the market went sideways. The interest rates for pretty much the entire life of this bond have been abnormally low interest rates due to the recession. Now with inflation, interest rates are starting to peak up. There were no further questions or comments.

With no further discussion, Mr. VeHaun called for a motion to approve the Consolidated Motion Agenda. Mr. Ashley moved, Mr. Whitesides seconded the motion. Roll call vote was as follows: 11 ayes; 0 Nays.

10. Consideration of Resolution adopting Preliminary Budget for FY 2023-2024 and the Schedule of Sewer Rates and Fees.

Mr. Powell reported that the proposed budget for FY23-24 is $56.6 Million. There is a 5.6% increase in Salaries and Benefits which has an impact of $905,867 and includes Personnel Committee recommendations of a 6.3% Salary Adjustments, 6.5% Self Insurance Funding, and GASB 75 OPEB Funding as well as 6.1% State required retirement contribution and unemployment funding. The Operations Budget includes a 5.8% increase in materials, supplies and service which has an impact of $487,000.00 This includes adjustments to address regulatory and operational needs including the High-Rate Primary Treatment Process which was completed in 2022 and is currently undergoing performance testing. The proposed budget also includes CIP Committee recommendations for FY 2023-2024 of $26.4 Million as well as Staff recommendations for Capital Equipment as well as Debt Service. On the funding side, Staff is proposing a 5.0% domestic rate increase which is approximately $1.73 increase in the average single family monthly bill. The average monthly bill will go from $34.10 to $35.83. Staff also recommends Sewer System Development Fee increases that were identified in the Raftelis report be implemented over the next five years, in addition to a 4% Rate of Return on investments.

Mr. VeHaun called for a motion to approve the Resolution adopting the Preliminary Budget for FY 23-24 and the Schedule of Sewer Rates and Fees. Mr. Ashley moved. Ms. Wisler seconded the motion. Roll call vote was as follows: 11 Ayes; 0 Nays.

11. Old Business: None.

12. New Business:

Mr. Whitesides announced that last night at the Buncombe County Commissioners Meeting, the new Comprehensive Plan was approved. He stated that it was a challenge and wants to thank to Nathan Pennington, his Staff and all of the Citizens who worked on this. There was a lot of good input, and they had a really good consultant working with them. He stated that it is something that can be worked with and adjusted as time goes on and when looking at this document, all members of the County and all sections of the County were taken into account.

13. Adjournment:

With no further business, Mr. VeHaun called for adjournment at 2:25 pm.

Jackie W. Bryson, Secretary/Treasurer

Metropolitan Sewerage District

Regular Board Meeting

May 17, 2023 @ 2 pm

	Agenda Item	Presenter
	Call to Order and Roll Call	VeHaun
	01. Inquiry as to Conflict of Interest	VeHaun
	02. Approval of Minutes of the April 19, 2023 Board Meeting	VeHaun
	03. Discussion and Adjustment of Agenda	VeHaun
	04. Introduction of Guests	VeHaun
	05. Informal Discussion and Public Comment	VeHaun
	06. Report of Committees	
	a. CIP Committee – April 25, 2023	Watts
	b. Personnel Committee – April 27, 2023	Bryson
	c. Finance Committee – May 2, 2023	Kelly
	07. Report of General Manager	Hartye
	08. Consolidated Motion Agenda	Hartye
	a. Consideration of Engineering Services Contract: Hydroelectric Power Plant Rehabilitation	Hartye
	b. Consideration of Engineering Services Contract: Biological Treatment Alternatives Evaluation	Hartye
	c. Consideration of Developer Constructed Sewer System –Terraces at Reynolds Mountain Ph. 4	Hartye
	d. Consideration of Auditing Services Contract FY 2023	Powell
	e. Consideration of Budget Amendment for Debt Service	Powell
	f. Cash Commitment/Investment Report-Month ended March, 2023	Powell
	09. Consideration of Resolution Adopting Preliminary Budget for FY 2024 and Schedule of Sewer Rates and Fees	Powell
	10. Old Business	VeHaun
	11. New Business:	VeHaun
	12. Adjournment: (Next Meeting 6/14/23)	VeHaun
	STATUS REPORTS	

BOARD OF THE METROPOLITAN SEWERAGE DISTRICT
April 19, 2023

1. Call to Order and Roll Call:

The regular monthly meeting of the Metropolitan Sewerage District Board was held in the Boardroom of MSD's Administration Building at 2:00 pm, Wednesday, April 19, 2023. Vice Chairman Kelly presided with the following members present: Ashley, Bryson, Dearth, Franklin, Lapsley, Manheimer, Pelly, Pennington, Watts, Whitesides and Wisler. Moore and VeHaun were absent.

Others present were Billy Clarke, General Counsel; Brian Goldstein with Woodfin Sanitary Water and Sewer District; Tom Hartye, Hunter Carson, Scott Powell, Mike Stamey, Pam Thomas, Ken Stines, Wesley Banner, Spencer Nay and Pam Nolan, MSD.

2. Inquiry as to Conflict of Interest:

Mr. Kelly asked if there were any conflicts of interest with the agenda items. No conflicts were reported.

3. Approval of Minutes of the March 15, 2023 Board Meeting:

Mr. Kelly asked if there were any changes to the Minutes of the March 15, 2023 Board Meeting. Mr. Whitesides moved for approval of the minutes as presented. Mr. Watts seconded the motion. Voice vote in favor of the motion was unanimous.

4. Discussion and Adjustment of Agenda: None.

5. Introduction of Guests: None.

6. Informal Discussion and Public Comment: None.

7. Report of Committees:

a. Right of Way Committee – March 22, 2023:

Mr. Kelly reported that the Right of Way Committee met on March 22, 2023 and made routine recommendations which are noted in the Consolidated Motion Agenda.

8. Report of General Manager:

Mr. Hartye reported that Pam Mease from 9 Elkdale Drive called to with appreciation for Mike Rice.

Mr. Hartye reported that as part of developing the preliminary budget, the CIP Committee will meet on April 25th to consider an update of the Ten-Year Capital Improvement Program and the FY 2023 Construction Fund Budget. The CIP Budget has gotten up to $531 Million. The total budget for

10 years is $1 Billion. The Personnel Committee will meet on April 27th to consider Cost of Living Adjustments and Benefit Allocations (i.e., Self-Funded Medical and Dental Program). The Finance Committee will meet May 2nd to consider a Preliminary Budget with an updated 10-year Business Plan which will incorporate the recommendations from the other Committees along with the proposed FY 23 Operating Budget and Sewer Rate recommendations.

Mr. Hartye reported that the CIP Committee will meet April 25th at 9 am. The Personnel Committee will meet April 27th at 9 am. The Finance Committee will meet May 2nd at 2 pm. The next Regular Board Meeting will be held on May 17th at 2 pm. The next Right of Way Committee Meeting will be held on May 24th at 9 am.

9. Consolidated Motion Agenda:

a. Consideration of Compensation Budgets – 96 Lookout Road SSR; Old County Home Road PSR; Onteora Blvd. @ Cleveland Avenue; Somerset Road @ Green Road:

Mr. Hartye reported that the Right of Way Committee recommended approval of these compensation budgets.

b. Consideration of Right of Way Policy and Procedure Updates:

Mr. Hartye reported that Ms. Banks shared with the Right of Way Committee some policy and procedural updates for right of way acquisitions. The Committee recommended approval of all updates and revisions to this document.

c. Consideration of Developer Constructed Sewer Systems – Appalachian Mountain Brewery; Enka Oak Street; Greenwood Park Ph. 2; Hawthorne @ Haywood Ph. 2; High Hopes Subdivision; Pardee Partners; Selwyn Townhomes; West City View Phase 1:

Mr. Hartye reported that the Appalachian Mountain Brewery project is located at North Mills River Road and Boylston Highway in Henderson County and included extending approximately 225 linear feet of 8-inch public gravity sewer to serve this Tap and Tasting Room.

Mr. Hartye reported that the Enka Oak Street project is located in Buncombe County and included extending approximately 125 linear feet of 8-inch public gravity sewer to serve 3 homes in this phase of this residential development.

Mr. Hartye reported that the Greenwood Park Ph. 2 project is located off Union Chapel Road in the Town of Weaverville and included extending approximately 1,450 linear feet of 8-inch public gravity sewer to serve 18 homes in this phase of this residential development.

Mr. Hartye reported that the Hawthorne @ Haywood Ph. 2 project is located in Buncombe County and included extending approximately 665 linear feet of 8-inch public gravity sewer to serve 92 apartments in this phase of this residential development.

Mr. Hartye reported that the High Hopes Subdivision project is located off Ben Lippen Road in the Town of Woodfin and included extending approximately 300 linear feet of 8-inch public gravity sewer to serve 13 homes in this residential development.

Mr. Hartye reported that the Pardee Partners project is located along Boylston Highway in Henderson County and included extending approximately 1,100 linear feet of 8-inch public gravity sewer to serve this new Ambulatory Surgery Center.

Mr. Hartye reported that the Selwyn Townhomes project is located in the City of Asheville and included extending approximately 993 linear feet of 8-inch public gravity sewer to serve 45 townhomes in this residential development.

Mr. Hartye reported that the West City View Ph. 1 project is located in the Town of Woodfin and included extending approximately 843 linear feet of 8-inch public gravity sewer to serve 22 homes in this phase of this residential development.

Staff recommends acceptance of the aforementioned developer constructed sewer systems. All MSD requirements have been met.

d. Cash Commitment Investment Report – Month ended February, 2023:

Mr. Powell reported that Page 43 presents the makeup of the District's Investment Portfolio. There has been no change in the makeup of the portfolio from the prior month. Page 44 presents the MSD Investment Manager's report as of the month of February. The weighted average maturity of the investment portfolio is 104 days and the yield to maturity is 4.50%. Page 45 presents the District's Analysis of Cash Receipts. Domestic User Fees are considered reasonable based on timing of cash receipts and historical trends. Industrial User Fees are considered reasonable based on timing of cash receipts and historical trends. Facility and Tap Fees are at budgeted expectations due to receiving revenue from various developers. Page 46 presents the Districts analysis of expenditures. O&M, Debt Service and Capital Project expenditures are considered reasonable based on historical trends and timing of cash expenditures. Page 81 presents the District's Variable Debt Service Report. The 2008A Series Bonds are performing at budgeted expectations. As of the end of March, the issue has saved the District rate payers over $7.4 million in debt service since April of 2008.

e. Consideration of Auditing Services FY 2023:

Mr. Powell reported that an RFP for Auditing Services was sent to five auditing firms. On March 30th, Staff received responses from Cherry Bekaert LLP, PBMares, and FORVIS. All firms exhibited knowledge of the utility industry in North Carolina. The Selection Committee chose Cherry Bekaert due to their audit approach, firm staffing and notably their governmental utility experience in North Carolina. The proposed fees for the FY 2023 engagement are $45,000.00 which is below the budgeted amount of $49,000.00. For the FY 2016 engagement, the amount was $45,000.00 as well. The Selection Committee recommends Cherry Bekaert LLP as auditors for the FY 2023 fiscal period. Ms. Wisler asked if Staff wanted to approve a three-year contract or just one year subject to any issues. Mr. Powell stated one year subject to any issues. Cherry Bekaert LLP will hold the other two years price per their RFP. Ms. Wisler asked if it had always been done that way. Mr. Powell stated yes.

With no further discussion, Mr. Kelly called for a motion to approve the Consolidated Motion Agenda. Mr. Watts moved, Mr. Ashley seconded the motion. Roll call vote was as follows: 12 ayes; 0 Nays.

10. Old Business: None.

11. New Business: None.

12. Adjournment:

With no further business, Mr. Kelly called for adjournment at 2:11 pm.

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Jackie W. Bryson, Secretary/Treasurer

CAPITAL IMPROVEMENT PROGRAM COMMITTEE
Minutes
April 25, 2023
9:00 a.m.

The Capital Improvement Program Committee of the Metropolitan Sewerage District met on Tuesday, April 25, 2023 at 9:00 AM in the MSD Administration Building. Chairman Bob Watts presided with the following MSD CIP Committee members present: Matt Ashley, William Lapsley, Chris Pelly, Nathan Pennington; and the following Member Agencies representatives present: Harry Buckner with the Town of Biltmore Forest, Debra Campbell with the City of Asheville, Shannon Tuch with the Town of Woodfin and Brian Goldstein with Woodfin Sanitary Water and Sewer District.

Others present were Jerry VeHaun, MSD Board Chairman; William Clarke, General Counsel; Tom Hartye, Hunter Carson, Scott Powell, Ken Stines, John Gosnell, Darin Prosser, Tim Hensley, Mike Stamey, Shaun Armistead, Brendan Davey, Angel Banks and Pam Nolan, MSD.

1. Call to Order

Mr. Watts called the meeting to order at 9:00 a.m.

Mr. Hartye welcomed everyone. He explained that the CIP Committee was developed in the 1990's when the various lines were donated to MSD. There were sewer lines and annexation projects, etc. that were identified by the municipalities that MSD took responsibility for, and we all met to make sure that those responsibilities and obligations were being met. The CIP Committee meets annually to go over the projects for the next 10 years and to review the Budget for endorsement from the MSD Board. An important part of this meeting is coordination. MSD will show you where we will be over the next 10 years with all of the projects. Now is a good time to see what is going on in your areas and pass this along to your water, storm water and paving folks to see if there are any areas where we can work together to save some money for our customers. The first item on the Agenda will be Highlights of the Current and Proposed Capital Improvement Program and the second will be the Review of the 10-year CIP and getting an endorsement from this Committee. Next year's budget is fairly normal compared to what we have had in the past at approximately $26 Million. However, the 10-year CIP has jumped up from approximately $400 Million to over $500 Million. The average over the next 9 years will be over $50 Million. One part of that is the 10-year window has moved and there are some larger projects coming in from both the plant and the system and the second part to factor in is inflation for future construction. Mr. Hartye then turned the meeting over to Hunter Carson, Director of Engineering.

2. Highlights of the Current and Proposed Capital Improvement Program

Mr. Carson proceeded with a Power Point presentation beginning with a summary of the proposed CIP Budget for the coming fiscal year. The proposed budget for FY23-24 is $26,377,993 Million. Approximately $9.9 Million is allocated to General Sewer Rehabilitation, approximately $3.4 Million is allocated to Interceptor and Wet Weather Rehabilitation, approximately $142,000 to Reimbursement Projects, approximately $8.4 Million to Treatment Plant and Pump Stations, approximately $180,000 to Private Sewer Rehabilitation, and approximately $3.2 Million to Design, ROW and Construction Management Expenses which includes salaries, benefits, fleet equipment, etc., associated with the Capital Improvement Program. Again, this year there is a flat Contingency of $1 Million for any unknown projects for

a total of approximately $26 Million. $26 Million is on par with what we have spent over the last few years on an average basis. This is a lot of money but the total estimated expenditures over the next 10 years are approximately $531.7 Million, the majority of which will be spent at the treatment plant and pump stations.

Mr. Carson reported that MSD now serves approximately 205,000 customers across Buncombe and Northern Henderson County with about 59,000 customer accounts and we serve about 264 square miles reaching as far East as Ridgecrest, to the North up to Weaverville, to the West to Enka-Candler and to the South into Northern Henderson County which is the former Cane Creek Water and Sewer District. MSD currently owns and maintains about 1,150 miles of sewer lines, over 34,000 manholes and 41 pump stations. MSD has over 6 Million feet of public sewer lines. Approximately 240 miles of that is small diameter line of 6-inches or less, and there are some 4-inch lines in the system. Approximately 824 miles are medium 8-inch to 21-inch in diameter and approximately 81 miles are large interceptors that range from 24-inch to the 66-inch which feeds the wastewater treatment plant. A lot of the infrastructure was built in the 1920's and 1930s so we are always in a state of rehabilitation.

MSD maintains an aggressive CIP Program thanks to the CIP Committee and MSD Board. On any given year, MSD has a goal of rehabilitating 40,000 LF of pipe every single year. 20,000 LF of that being performed by System Services in-house crews. The other 20,000 LF is contracted out. During consolidation in 1990 MSD inherited about 900 miles of sewer lines, a lot of it in poor condition. Since that time, MSD has replaced approximately 251 miles of the system or roughly 28% of the inherited system. Mr. Carson presented a graph of sanitary sewer overflows over the last 30 years and stated that closer to the beginning of consolidation there were upwards of 300 SSO's. Due to the major investments that we have placed into the system over the last 30 years, that number has been drastically reduced, with the average being 30-40 SSO"s per year.

Field personnel are out all of the time CCTV'ing and cleaning lines and turn in various projects to the Engineering Division. Projects are then prioritized and scheduled according to their pipe ratings. Pipe rating includes the following aspects: SSO and overflow history, structural condition, customer service requests, monitoring schedule by MSD Staff and proximity to streams and waterways. These projects are then assigned a value from 0 to 100 with 100 having a greater consequence if it failed and a greater likelihood of failure. The higher pipe rated projects get constructed ahead of those with a lower pipe rating. Mr. Carson presented a graph showing the 10-year CIP Projects prioritized by pipe rating with the projects at the top being the most problematic and to be constructed in the first few years of the 10-year CIP. Whereas the projects with lower pipe rating will be pushed out further into the 10-year CIP.

Mr. Carson stated that MSD In-house crews also pipe rate projects. As previously stated, In-house crew's goal is to rehabilitate 20,000 LF of pipe per year. Mr. Carson presented maps and before and after pictures of In-house Rehabilitation Projects completed this fiscal year. South Main Street @ Reems Creek Road Rehabilitation is located in Weaverville and consisted of replacing approximately 592 LF of 6-inch clay line that was in bad condition with a lot of blockages in the system. The old line ran under a home, so it was difficult to maintain. This project was completed in October and November of 2022. The Albemarle Commons Pump Station Elimination Project is located in Haw Creek in East Asheville. MSD is opposed to pump

stations; we don't like to entertain new pump stations and like to eliminate those that we do have whenever possible. We figured out a way, using about 630 LF of gravity line, to eliminate this station. There is a 100% reduction in energy usage by eliminating this pump station. In addition, per State Standards, MSD maintenance crews have to go to all of these pump stations at least once a week so we cut that out by not having this station. And we also recognize a savings of about $15,000 per year for operation and maintenance and eliminating potential for SSO's due to mechanical failure with the pumps. This project was completed in November, 2022. The Charlotte Street @ North Ridgeway Avenue Project is located in Black Mountain adjacent to Black Mountain Primary School and consisted of replacing approximately 1,233 LF of 4-inch and 6-inch VCP and PVC with new 8-inch DIP. This project was performed last summer to coordinate around the school schedule. Mr. Carson stated that over the past several years MSD averaged about $1.5 Million in paving costs and last year was no exception. Last year alone MSD spent over $1.4 Million in paving either in the City of Asheville or NCDOT streets.

Mr. Carson then presented maps and before and after construction pictures of rehabilitation projects contracted out over this past fiscal year. The Aurora Drive Project is located in the Kenilworth neighborhood in Asheville and consisted of replacing about 2,476 LF of 6-inch VCP with 8-inch HDPE by pipe bursting. This project was completed by Terry Brothers Construction Company for $684,000. Pipe bursting is a trenchless technology that breaks or bursts the old pipe while pulling in a new and oftentimes, larger HDPE pipe in its place. This technology minimizes surface damage and requires less restoration work after the project. Mr. Carson presented videos of this process. Pipe bursting cannot always be used for several reasons. The bursting head comes through and breaks the smaller pipe and displaces the soil around it so if there is a pressurized gas line or water line adjacent to the sewer line you can potentially compromise the other surrounding utilities. In addition, if you have a shallow line you can experience ground heave from the displaced soil. Also, most importantly, the new pipe follows the alignment of the old. In sewer we like to have "gun barrel" straight pipes that are on grade so if you have any bends or sags in the line it is not a good application to use. You also shouldn't use near structures because you have the percussive action of the bursting head which could damage the foundation of a home. Sometimes it can also be a more costly rehabilitation method but on a project such as Aurora Drive where it was 2500 LF MSD did recognize some economies of scale and it came out in our favor. The Bent Tree Road Project is located in the Grove Park area in North Asheville and consisted of replacing approximately 1,654 LF of 6-inch VCP that had a lot of structural problems and I&I (inflow and infiltration). I&I is groundwater that gets into the pipe through poor joints or fractures in the pipe and we want to eliminate this because it ultimately ends up at the plant. This project was completed by Terry Brothers Construction for approximately $980,000. Mr. Carson stated that in his 12 years here, this is probably the first job that he had seen that exceeded a 60% design slope. There was actually a track hoe at the top holding a track hoe at the bottom with a steel cable. Mr. Carson pointed out the green pipe in one of the pictures and stated that for years MSD has used DIP, however, due to ongoing supply chain issues with DIP, specifically smaller diameter DIP, the lead time is about a year. MSD has transitioned a lot of projects to a heavier walled PVC pipe which is corrosion proof and as long as it is bedded properly it is very strong. The Christian Creek Interceptor Project is located in East Asheville and is the longest collection system job that MSD has had in quite some time at over 12,000 LF. The existing pipe is 8-inch clay and serves a large area, so it was quite undersized. This system is in the process of being upgraded to 12-inch, 16-inch and 18-inch pipe. This is an ongoing project and is approximately 75% complete.

Buckeye Bridge LLC is the contractor with a contract of just under $6 Million. Bore and Jack is another trenchless technology that is being utilized on this project. There are six bores on this project, four of which are under an NCDOT road, and two are under Norfolk Southern Railroad. Mr. Carson explained the bore and jack process. The two Norfolk Southern existing crossings have been in place since about the 1920's. Norfolk Southern was initially asking $100,000 to allow MSD to replace these crossings. Mr. Clarke was able to work with them and they agreed upon $12,000 for each crossing. Norfolk Southern also requires their own full-time inspectors and flaggers to be on site during construction in their right of way at a cost to MSD of $2,700 a day.

Mr. Carson then presented maps and pictures of contracted projects to be completed in FY23-24 and beyond. The Buchanan Avenue Project is located in downtown Asheville near McCormick Field and consists of replacing 2,204 LF of 6-inch VCP. Total project cost is estimated at $1.3 Million. The Cherokee Road Project is located in North Asheville in the Grove Park area and consists of replacing 1,960 LF of 6-inch VCP that is in poor condition with some of the segments running under houses, retaining walls or other physical features making repairs difficult. Total project cost is estimated at $1.15 Million. The Erwin Hills @ High School Project consists of replacing 121 LF of an existing aerial creek crossing that is in poor condition and is difficult to maintain and has resulted in quite a few SSO's over the years. Total project cost is estimated at $67,000. The Lining Contract No. 9 Project is over $2 Million. The project has already been bid but the majority of the work will occur in the next fiscal year. Roughly every 5 years MSD does a CIPP (Cured In Place Pipe) Lining Project. There is a felt liner impregnated with resin that is inverted into the pipe that essentially creates a new pipe inside of the old pipe. He passed around a sample of this pipe with the new liner inside. The liner is cured with hot water, steam, or UV light.

The Weaverville Pump Station Replacement Project is also coming up in FY23-24. This pump station serves all of Weaverville and pumps back to the treatment plant. The existing stations have been upgraded two times since originally installed in the 1980's. The current capacity is 2.8 MGD and will be replaced with a new 5.0 MGD station which will accommodate flows through 2070. In addition, approximately 18,000 LF of 24-inch force main will be replaced. The total project cost is estimated at $22.1 Million. CDM Smith is the project consultant and they are just beyond a 90% design level. There are about 21 properties that will require easements and MSD Staff will be acquiring rights of way. Construction on this project is anticipated to begin in FY24-25.

The Carrier Bridge Pump Station is MSD's largest pump station with a current capacity of 22 MGD. This station will be replaced with a 40 MGD station to accommodate a 50-year planning horizon. This pump station is located near the Amboy Road Bridge and serves a lot of western Buncombe County, all of south Asheville and portions of northern Henderson County. The current pump station is located adjacent to the French Broad River Park. The new pump station will be located on a parcel next to the existing pump station on a parcel that MSD purchased from Duke Energy several years ago. HDR is the design consultant for this project. Construction is anticipated for Fall of 2024. The total project cost is estimated at $65 Million. Since this project is located close to greenways and the French Broad River Park, the pump station will be totally enclosed and will have odor control. Along with the station will be 800 LF of new 60-inch inlet piping to feed the station, and coming out of the station, two (2) 36-inch pressurized discharge force mains that will cross over the French Broad River. Also, during this project there will be

some rehabilitation to the 54-inch pipe that is currently situated on the east side of the river. Staff is currently in the permitting process to open cut across the river. There is a heavy load of permitting required to get that accomplished. Staff has recently submitted to the Army Corp of Engineers for that approval. In order to even be able to submit that, Staff had to have an archaeological study, establish best management practices for erosion control and bank stabilization, draft a river recreational plan, do a tree survey and mitigation plan, and perform an endangered species survey.

Mr. Carson then reported on projects ongoing or completed this past year at the Water Reclamation Facility. The plant is permitted for 40 mgd and on an average day we treat about 23 mgd. MSD utilizes Rotating Biological Contactors (RBC's). As the RBC's rotate through the wastewater, a biomass of microorganisms on the surface of the RBCs consume organics in the water. We are essentially replicating what would happen in nature, just in a much smaller footprint. MSD has a Fluidized Bed Incinerator for solids disposal. MSD's is one of four incinerators in the State of North Carolina.

The High-Rate Primary Treatment is a clarification process that removes solids and organics from the wastewater upstream of the RBCs. This is a "high rate" process, so it does utilize various chemicals, both a coagulant and a polymer, which promote rapid settling. Construction was completed in January, 2023. Veolia, the equipment manufacturer, is still on site helping to optimize the system. The total project cost was $17.2 Million.

The Equipment Storage Facility Project is to replace the old Nutri-Lime Building that burned in November 2020 and will house MSD owned equipment. It includes open-air storage and more secure enclosed storage. There have also been pipe storage racks added which will help the footprint. This project should be completed in the next two months. The total project cost was $3.4 Million.

The RBC Slide Gate Replacement Project consists of replacing the aluminum slide gates at the influent and effluent side of the RBC basins. Functional gates are critical to operation and maintenance of the biological system as they allow isolation of the basins to dewater them for maintenance purposes. The existing aluminum gates were severely corroded. This project is in the second phase of these gates being replaced with stainless steel gates and should be complete late Summer of 2023. The total cost for both phases was approximately $950,000.

The Incinerator Polymer System Replacement Project was completed in the Summer of 2022. This is located in the Incinerator Building. The old system was about 30 years old and in really bad condition. This project was performed 100% from cradle to grave by MSD Personnel. The Engineering team designed the system and the Mechanical, Electrical, Building Trades and SCADA group installed and placed the entire system into service. This was a really great group effort from the personnel here at MSD. The total project cost was approximately $352,000.

Solids Handling processes are unit processes that enable reduction of the volume of solids generated during wastewater treatment and also enable stabilizing and disposal of them. The processes at MSD's treatment plant are specifically sludge thickening, dewatering (belt filter press) and disposal (incinerator). A lot of the solids handling processes at the plant are nearing the end of their useful life. Their capacity also has to increase due to future sludge generation. Board Members may recall at the last Board meeting they approved a PER that was awarded

to Hazen & Sawyer which will be about a one-year study. This study will help evaluate the existing solids handling systems and look at new alternative technology to replace the solids handling processes currently in place at the plant. There is a 30-year planning horizon and currently have $56 Million allocated to solids handling replacement projects over the next approximately 6 years. He presented pictures of the Gravity Thickeners, Belt Filter Presses and Fluidizing Bed Incinerator. The Gravity Thickeners are about 39 years old. Belt Filter Presses are devices that help dewater the sludge prior to being burned in the incinerator. The Fluidizing Bed Incinerator is about 31 years old and has undergone multiple rebuilds and upgrades. As we go through the PER process with Hazen and Sawyer, and the design and construction, this will take some time and the existing systems need to be kept online and functioning properly. There are rehabilitation projects associated with the incinerator that are upcoming. The Incinerator Heat Exchanger Replacement project consists of installation of a new unit and removal of the existing heat exchanger which is showing signs of internal corrosion. This unit has a very long lead time of about 9 months to be fabricated and shipped. Arrival is anticipated in August of 2023. The total cost was approximately $1.1 Million. Another incinerator related project was the Incinerator Dome Rehabilitation project which was completed in February 2023.

The Biological Treatment Replacement project is the final project to report on. The RBC's are at the end of their service life at 34 years old and require replacement. Equally important, we are going to have a new permit limit applied to our NPDES permit which goes into effect in 2030. Staff is in the process of moving along a PER to look at various technologies and what would best suit the plant, then design and construction which should be complete and get us into compliance right before the October 2030 deadline. The total estimated project budget is $90 Million. With the help of the PER these costs will be updated over the next couple of years. This PER will be taken to the May, 2023 Board for approval and is estimated at $600,000.

Mr. Carson reported that over the past 24 years just over $70 Million has been spent at the Water Reclamation Facility. Over the next 10 years MSD intends to spend approximately $177 Million with the majority of that coming from the Biological Treatment Replacement and Solids Handling projects.

Mr. Carson presented the Ten-Year CIP Summary document and stated MSD operates on a balanced budget so all of the revenue that comes into MSD, which for the current fiscal year is $59.8 Million, is equal to the expenditures. Approximately 2/3 of all expenditures are CIP project related, either in the form of construction or bonds that are associated with the CIP projects. Total project cost estimates over the 10-year CIP are $531.7 Million. The majority to be spent at the treatment plant and a couple of pump stations. Mr. Pennington asked if all eyes would be on what the EPA decides to do with the PFAS removal. Mr. Carson stated that MSD will definitely have to keep our eyes open on the effluent as well as solids handling. Currently there are no requirements that we are aware of but the fact that it has been applied to drinking water it is probably something that will be discussed more in the future as far as wastewater.

There were no further comments or questions.

3. Capital Improvement Program Priorities & Review of the Ten-Year CIP Document

There are 85 projects in the 10-year CIP in these six different areas. Staff is proposing $3,443,803 for 5 Interceptor and Wet Weather projects; $9,930,098 for 50 General Sewer Rehabilitation projects; $177,900 for 2 Private Sewer Rehabilitation; and $8,402,202 for 25 Treatment Plant, Pump Stations and General Capital Improvements; Design, Right of Way and Construction Management Expenses for next year is $3,281,040; and $142,950 for Developer Reimbursements. The subtotal for the proposed budget for FY23-24 is $25,377,933. A flat contingency of $1,000,000 is proposed. This brings the total proposed CIP Budget for FY23-24 to $26,377,933 and is the amount for which staff is seeking this Committee's endorsement. Mr. Hartye added that all of these projects use to have a contingency amount of about 15%. MSD found that we were inflating our CIP by doing that with so many projects, so we took that out and added a flat $1 Million contingency which averaged out to about 3-4%.

This full budget document, with detailed information for each project, is posted on the main page of the District's website at www.msdbc.org/cip/php.

Mr. Watts added that he would encourage those in attendance look at the projects in their respective areas and if they interact with anything you are planning to do, get in touch with Mr. Carson because some of these projects can be shifted and combined with another entity's projects.

Mr. Watts called for a motion. Mr. Ashley moved to approve Staff's recommendation of Endorsement of the CIP Budget for FY 23-24 in the total amount of $26,377,933. Mr. Pennington seconded. Voice vote was unanimous.

Mr. Carson thanked the Engineer Staff; Angel Banks, Right of Way Manager; Cheryl Rice for helping put the whole document together; Pam Nolan and Daniel Marsh.

There was no further business or discussion. The meeting was adjourned at 10:05 a.m.

PERSONNEL COMMITTEE MEETING
April 27, 2023
9:00 a.m.

Call to Order

Jackie Bryson called the meeting to order at 8:57 am. Personnel Committee members attending; Jackie Bryson, Doug Dearth, Al Whitesides, Sheila Franklin, and Billy Clarke, Staff members attending; Tom Hartye, Scott Powell, Pam Thomas, Meredith Troughton, and Ken Stines.

Inquiry as to Conflict of Interest

Mrs. Bryson inquired but there were none noted at this time.

Employee Engagement 2022 Presentation

Mrs. Troughton gave a presentation to the committee members that highlighted employee events that were held in 2022.

Events included the following:

- MSD presentation in Local Elementary Schools
- Retirement Parties
- Employee Appreciation Lunch in our new picnic shelter
- Staff Ugly Shirt Day
- 2022 Employee Picnic
- Employee Halloween Celebration
- Employee Christmas Lunch
- St. Patrick's Day Celebration
- 3 Local Job Fairs

Mrs. Troughton also introduced the new MSD Employee Training Center to the Personnel Committee. MSD Staff has outgrown the current space available in the Mull building, as most trainings were conducted in the Boardroom. MSD building trades along with other staff have helped to update the old MSD administration building, which was previously being occupied by Head Start. The addition of this new space has provided MSD employees as well and other industry employees with a much-needed local training facility.

Mrs. Troughton highlighted two internal committees that MSD employees serve on: the first being the Employee Advisory Committee. The EAC Committee was established to facilitate and foster communication between management and MSD employees on issues affecting MSD employees. The Committee makes suggestions to the Management Team on matters such as employee benefits, working conditions, safety, and employee social events. Each Department selects a representative to serve on the Committee. The second is the EMS team that works with our safety division to help ensure compliance with ISO 14001-MSD's Environmental Policy.

Mrs. Franklin asked who chooses the members of the EAC and the EMS committees. Mr. Hartye explained that they were volunteers from each department and then we train them to be internal auditors.

Mrs. Troughton informed the Committee of ideas and projects MSD is looking at doing for FY2023.

- River Clean Up
- Revitalize the MSD Wellness Committee
- Wellness Fair
- Partnership with Noom
- Cooking with Comedy

Mr. Hartye informed that at the July Personnel Committee meeting will be a presentation on succession planning along with the regular General Manager evaluation.

MSD Staff Statistics

Mrs. Thomas presented the following information:

- Average years of age is 44.
- 10 years of service
- Full-time employees- 152
- The turnover rate is 6.6.
- 10 -year turnover average – 5%

Projected Health Care costs for MSD

Mrs. Thomas presented the following information:

- Medical & drug cost inflation trend for the south region
  12% for medical
  17% for drug
  Proposed increase 6.5%

- Minimize costs through Prevention!
  In-house PA one day a week
  Advent Advantage meetings
  Wellness Activities and Wellness Newsletter
  Required physicals-required every 2 years, and flu shots.
  Workout & weight rooms and healthy activities

Mrs. Franklin asked how long the district had had the preventive initiatives in place. Mrs. Thomas respond that most of the programs have been in place for at least 10 years. Mrs. Franklin asked what the percentage of engagement we have in our current programs. Mrs. Thomas explained that currently we have 32 employees enrolled in the Advent Advantage program. When asked why there were not more, Mrs. Thomas reminded them that an employee must qualify for the program based on a chronic health condition.

MSD Insurance changes Over Time

Mrs. Thomas presented the following information:

- Partnered with Advent Hospital to offer higher discounts that save the district and employee's significant cost.
- Working with the Pharmacy Benefit Manager (PBM) has reduced drug costs.
- Requiring that working spouses be covered as "primary" by their employers.
- Increased specialist and Urgent Care co-pays to $40.
- Partnered with Range Urgent Care to offer discounts that saved the district and employees significant costs.
- Pharmacy Overlay program for cost savings, since inception, of $116,620.
- Savings of $224,103 for having MedWatch involved in case management for employee's medical care.

Mrs. Thomas Explained that the pharmacy overlay is a membership program that looks at high-cost medication and the member's household income. Because the medications come at no cost from the manufacturer, members can save 100% and MSD can save 75% of the costs.

Projected Health Care costs for MSD

Mrs. Thomas referred to Attachment 1 which showed the projected health care cost for MSD. This includes medical dental and drug cost. Some of the cost drivers are rising medical and drug inflation.

Salary Information

Mrs. Thomas presented a slide that showed the past 12 years of the Consumer Price Index (CPI). She specifically referenced the following years:

- 2021 CPI was 8.1% and the district gave a 7% increase FY 2021-2022.
- 2022 CPI 6.3% and Staff is asking the board to approve a 6.3% increase FY 2022-2023.

Mrs. Thomas also presented the Personnel Committee with a chart that showed the projected increase in other municipalities, and the private sector was planning to give their employees this year.

Mrs. Franklin asked why the CPI was 8.1% last year and the district only gave 7%. It was explained that with the compensation study that the district completed, a large number of employees received additional compensation on top of the approved COLA amount.

Mrs. Franklin asked what the entry level pay was. Answered: $17.40. Mrs. Franklin also asked how many employees we currently have at the $17.40. To which Mrs. Thomas responded with five employees.

Mrs. Thomas explained that MSD has a step program for our SSD division that has a 7-level promotional program. This step program includes cross- training, time in position and CDL's.

MSD Staff Recommendations

At this time, the district asked the Personnel Committee to approve the following:

- 6.3% annual wage increase COLA for employees starting July 1, 2023
- 6.5% increase for the Self-Insured Medical Plan
- 6.2% increase in State required contributions for the NC Retirement Plan
- Total Amount requested $906,000.00.

Motion:

A motion was made by Mr. Whitesides to accept the staff's recommendations. Mr. Dearth seconded the motion.

Mrs. Bryson called for the vote. It was unanimous in favor of the motion.

Other

Mrs. Bryson stated there was no other business at this time.

Adjourn

With no further business, Mrs. Bryson adjourned at 9:27 AM. No future meeting has been scheduled.

Finance Committee Minutes
May 2, 2023

Call to Order

The Finance Committee of the Metropolitan Sewerage District met in the Boardroom of the Administration Building on Monday, May 2, 2023. Chairman Kelly presided and called the meeting to order at 2:00 pm with the following members present; Nathan Pennington, Jackie Bryson, Gwen Wisler, and Esther Manheimer.

Others present were Jerry Vehaun, Board Chair; Thomas Hartye, General Manager; Billy Clarke, Board Legal Counsel; and Scott Powell, Director of Finance.

1. Third Quarter Budget to Actual Review

Scott Powell started with a PowerPoint presentation of the Third Quarter Budget to Actual. Both domestic revenue and industrial revenue are slightly above budgeted expectations. Facility Fees are higher due to receiving unanticipated revenue from various developers. Interest and Miscellaneous income are above expectations due to higher short-term interest rates above what was anticipated. Operation and Maintenance expenditures and Capital Projects expenditures are below budgeted expectations due to low chemical use with the high-rate treatment process and hydro generated electricity. Bond and principal interest are slightly below 75% due to the timing of July 1 payment. Capital equipment is at 51% due to supply chain issues and delays in receiving ordered vehicles. Year-end projections are in line with or better than budget expectations for domestic, industrial revenue, and facility fees. Operation and Maintenance expenditures will be in line or slightly below budget. CIP expenditures will be lower than budget due to one project deferred this year and one that will be completed at beginning of the next fiscal year.

2. FY2024 Proposed Budget

Mr. Powell continued with highlights of the FY2024 Proposed Budget. The Operations and Maintenance budget is $20.9 million, CIP $26.4 million, Capital Equipment Replacement $.59 million, and Debt Service $8.7 million for a total of $57 million.

Operations & Maintenance budget includes an 5.6% increase in salaries and benefits with a total budget impact of $905,867. The budget also includes a 6.3% COLA salary increase for all employees, a 6.5% increase in self-insurance funding, GASB 45 / 75 OPEB funding, unemployment compensation funding, and a state mandated increase in North Carolina Retirement funding of 6.1%. Materials, Supplies, and Services include a 5.8% increase of $487,231. The increase is to address regulatory and operational needs, including the newly constructed High-Rate Primary Treatment project process, and increased cost of materials. Ms. Manheimer notes that the City of Asheville is proposing 5 to 6% COLA.

Mr. Powell next discussed information on Personnel Growth and Trends in Health Care Cost.

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May 2, 2023

Personnel Growth has trended downward since 2001 with current staffing holding steady at 152 employees. He stated the District health care costs are trending below medical inflation. This is due in part to the district's direct contracts with Advent Health, Range urgent care, and Open MRI.

Operation and Maintenance expenses have increased an average of 3.5% over the past 9 years, while averaging 94.2% Actual-to-Budget Ratio. This is primarily due to the deferred utility costs which is a direct result of operations of the hydroelectric facility.

The FY2024 proposed Capital Improvement Program budget is $26.37 million. Major Capital Improvement projects for FY2024 are $2.4 million on Christian Creek Interceptor, $1.3 million on Buchanan Ave, $1.8 million on Lining Contract No. 9, and $2.2 million on Incinerator Rehabilitation.

Capital Equipment Replacement includes Operations & Maintenance at $110,198; Fleet Replacement requests at $193,619; Pump Station Replacement at $74,000, and Water Reclamation Facility $217,000.

The District's debt composition as of June 30, 2023 will be $82 million in total, with 75% ($61.34 million) in traditional fixed income, and 25% ($20.67 million) in synthetic fixed debt. Mr. Powell noted we are at the same level of debt we were at 20 years ago. FY2024 debt service is $8.73 million, which consists of $5.6 million in principal and $3.1 million for interest.

Proposed Expenditures for FY2024 are expected to be $56.6 million. Approximately two-thirds of expenditures are related to the CIP Program - Construction Projects at $26.4 million (46.6%), Capital Equipment at $0.59 million (1.1%) and Debt Service at $8.7 million (15.4%). Roughly a third of the budget pertains to Operations at $20.86 million (36.9%).

Mr. Powell continued his presentation discussing Revenue Highlights. We anticipate a 0.75% growth in residential users, 0.75% growth in domestic consumption, facility and tap fees are projected at $3.2 million (5.7%), $3 million in facility fees, $200,000 in tap fees, and a 4.0% rate of return. To maintain a balanced budget, proposed revenues of $56.6 million are made up of $40 million (70.9%) in domestic user fees, $3.4 million (6%) in industrial user fees, $6.45 million (11.4%) other sources and uses, and $3.4 million (6%) in interest and miscellaneous.

3. Business Plan

The Business Plan is a long-term (ten-year) plan for projected sewer rates and revenues, operating expenses, CIP needs, and debt coverage ratio. Staff uses the District's master plan objectives, regulatory requirements, liquidity and debt service requirements, the CPI, and other indexes to decide on the level incremental sewer rate increases and equalize the rates over the 10-year period. Budget assumptions used include 0.75% growth in residential users, 0.75% increase in domestic

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consumption, facility and tap fees budgeted at $3.2 million, and a 4.0% rate of return on investments in the current year.

For reference, Mr. Powell noted funding of the CIP for the last 10 years has been 70% Pay as You Go and 30% Debt Issuance.

In the next ten years, the District will be investing $531.8 million into its infrastructure at a ratio of 40% Pay as You Go and 60% Debt Issuance. Over the 20-year period, this aligns with our goal to maintain a 50/50 mixture of Pay as You Go to Debt Issuance. Due to the nature of coming regulatory requirements, heavy investment in the WWTP is required through issuing debt and/or raising rates. To modulate rate increases, issuing debt enables generational sharing of the system costs allowing the rate increases to be gradual vs. sudden. The current 10-year CIP is $531.8 million. Last year at this time, the 10-year projected CIP was $382 million. Most of this increase is due to new investment required at the WWTP. Mr. Hartye added that larger projects have entered our 10-year window. The 10-year CIP Program will be made up mostly of investment in the treatment plant at 52%, and 30% in the collection system, and 18% for the interceptors. From consolidation through the end of FY2022, the District has invested $475.8 million in infrastructure.

Cost reduction measures and value engineering have resulted in $5 million savings on the Incinerator Project, $5 million savings on RBC replacement, and a phased approach to Treatment Plant Improvements to move out $90 million RBC Upgrade. Total Operations and Maintenance expenditures have averaged 3.5% annually over the last 10 years, of which 60% is salary driven. Materials, supplies, and service expenditures have averaged 2.2% annually over the last years. Non-recurring revenues from Duke power are slated to end this fiscal year.

The District expects steady slow growth in user charges. System development fees are projected conservatively due to changing economic cycles as it has a direct impact on rates going forward. System development fees collected over projections would reduce future debt issuance.
Additionally, the District's business plan projects five debt issuances over the course of the next 10 years as well as 5.0% projected increases for the ratepayers for the next 10 years. Debt coverage ratios will exceed the 1.5% target rate. Mr. Powell highlighted that two thirds of capital assets are CIP related.

4. Rate Information

On July 20, 2017, the NC General Assembly signed into law NC General Statue 162A Article 8 which provides the uniform authority to implement system development fees for public water and sewer systems. This statute stipulates the District performs a study every 5 years as it pertains to District rates. All fees must be prepared by a financial professional or licensed professional engineer. The District engaged Raftelis Financial Consultants to perform the calculation.

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Based on Raftelis's report, system development fees for single-family residential and mobile home fees proposed to increase from $2,836 to $6,495 and multifamily residential from $1,900 to $4,351. Due to the significance of these proposed increases, staff recommends implementing these increases over a 5-year period to align with the 5-year study period. Ms. Wisler asked why such a large increase in development fees related to inflation of the period. Mr. Powell indicated inflation does affect the proposed rate increase, but a majority of the rate increase is due to actual cost of material for larger diameter pipe. Investment in the system has a direct impact in relation to the fee generated from the study. Mr. Powell pointed out that the customer is buying into an improved system. Mr. Hartye added the District is using the capacity buy-in method, as the value of the system has increased and this value is more accurately determined based on currently available data. Ms. Wisler asked if the rate increase would be implemented gradually over 5 years. Mr. Powell confirmed the rate increase would be implemented uniformly over 5 years. Ms. Manheimer expressed concern over the effect development fee increases would have on housing affordability. Mr. Hartye stated the system development fee increases should be implemented and are based on technical data, specifically water usage and that the District offers a separate development fee for affordable housing development. Ms. Wisler asked if the statute allows implementation of fee increases over time. Per Mr. Hartye, the statute does not mandate the fee increases, but prescribes the study be performed and the fees increases cannot exceed those determined in the study. Ms. Manheimer requested clarification of the system development fee vs. a tap fee. Mr. Powell stated the system development fee is a one-time charge assessed to new customers to recover up-front system capacity cost. Tap fees is a charge for connecting to the sewerage system. Ms. Manheimer continued stating the City of Asheville is in the process of a study to restructure their monthly fees schedule and asked if that would have an impact to the District. Mr. Hartye stated the District went through the process of establishing a rate parity plan between domestic and industrial customers 20 years ago with parity being achieved in FY2020. Discussion ensued between Ms. Manheimer and Mr. Hartye as to the potential adjustment to the City's fee's structure and its conservation signaling.

Mr. Powell continued stating the District uses NACWA as an information source because they give average monthly bills, including both flow and maintenance costs. Based on data for EPA Region IV – Southeast, the District's average monthly residential bill compares favorably. Additionally, the District's average monthly bill compares favorably to other North Carolina AA and AAA sewer providers.

Staff recommends Sewer System Development Fee increases identified in the Raftelis report to be implemented over the next five years and no change in Sewer Connection Fees change in accordance with staff recommendations; a 5% increase in the Domestic Flow Rate and Base Meter Charge; this would be a $1.73 increase in average single-family monthly bill (20.76/year) bringing the average bill from $34.10 to $35.83. Additionally, staff recommends a 5% increase in the Industrial Rate.

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The District's proposed rate increase is to provide funding for the CIP Program, maintain favorable debt service ratio to minimize future interest expense, and to keep rate increases small and uniform per industry standards and previous District Board directions.

In closing, Mr. Powell gave special thanks to Division Heads and respective staff, his finance team, and Jody Germaine, Budget Analyst.

Recommendation for Proposed FY24 Budget and Schedule of Rates & Fees for FY24

Following Mr. Powell's presentation, the floor was opened to questions or comments. Ms. Wisler asked if the District is experiencing a high volume of vacant positions. Mr. Hartye answered that we have only 4 vacancies out of 152 positions. Mr. Powell added that the recent pay study and subsequent pay increases performed have helped alleviate the number of open positions and bolstered the retention of existing employees. With no further questions, Mr. Powell directed the Committee's attention to the two action items on the agenda, The Proposed Budget/ Budget Resolution for FY2024 and the Proposed Schedule of Rates and Fees for FY2024. Chairman Kelly calls for any additional questions or comments. Chairman Kelly deferred to board counsel if the two resolutions can be handled with one vote, due to the nature of the Committee's advice to the full Board being purely recommendatory. Mr. Clarke recommended a separate vote be used for each item. Gwen Wisler to recommend to the full board the proposed FY24 Budget/Budget Resolution. Glenn Kelly seconds. With no further discussion, the motion was carried unanimously. Glenn Kelly to recommend to the full board the proposed FY24 Schedule Rates and Fees. Nathan Pennington seconds. With no further discussion, the motion was carried unanimously.

Adjournment

With no further discussion, Chairman Kelly called for adjournment at 2:47 pm.

MEMORANDUM

TO: MSD Board

FROM: Thomas E. Hartye, P.E., General Manager

DATE: May 11, 2023

SUBJECT: Report from the General Manager

- FY 2024 Preliminary Budget

  The proposed FY 2024 Preliminary Budget of $56,569,965 will be presented which includes $26.4 Million in Construction along with a $20.8 Million Operating Budget and $8.7 Million in Debt payments. The proposed Sewer Rate increase is 5.0% as required by our business plan to fund the $531 Million ten-year Capital Improvement Plan (CIP). New Connection Fees will be adjusted as a result of the Fee Study which was conducted pursuant to NC General Statute 162A Article 8.

- Kudos

  - Attached is an email from Steve Henry, Facilities Manager at St. Mark's Lutheran Church. Thanks to Mitch Metcalf, Dylan Dyer and Dalton Hyatt.

  - Attached thank you email from Calvin Owens, Outreach Coordinator – COA.

- Board/Committee Meetings/Events

  The next Regular Board Meeting will be held on June 14th at 2 pm. The May Right of Way Committee meeting is cancelled. The next Right of Way Committee meeting will be held on June 28th at 9am.

Metropolitan Sewerage District of Buncombe County
INFORMATION ONLY ITEM

BOARD MEETING DATE: May 17, 2022

SUBMITTED BY: Tom Hartye, P.E. - General Manager

PREPARED BY: Hunter Carson, P.E. - Director of Engineering
Tim Hensley, P.E. - Project Manager

SUBJECT: Consideration of Contract for Engineering Services: Hydroelectric Power Plant Rehabilitation, MSD Project No. 2021016

BACKGROUND: MSD's Hydroelectric Facility and the Craggy Dam Reservoir were constructed in 1904 for electric generation by the W.T. Weaver Power Company. Between 1926 and 1963, Carolina Power and Light Company owned and operated the facility prior to selling to MSD soon thereafter.

In 1984, MSD rehabilitated the Hydroelectric Facility and began generating power to offset a significant amount of the treatment plant's annual electrical demand. Rehabilitation included a new intake structure, new concrete flume, installation of three new hydraulic turbines, and improvements to the dam. Since then, the Hydroelectric Facility has offset the cost of energy at the treatment plant by $300,000-$600,000 annually.

Over the past 38 years, normal wear has occurred to the system's components and structures, and equipment has become obsolete. Operational issues include troublesome intake gates, frequent turbine bearing failures, and generally outdated generating equipment inside the power plant. Due to the facility's age and condition, upgrades and/or rehabilitation is necessary to continue generating power safely, reliably, and efficiently.

In accordance with *NCGS 143-64.31,* MSD advertised a Request for Qualifications for a Hydroelectric Facility Conditional Assessment. The study will include the evaluation of all structural and generating components, and a cost/benefit analysis of recommended improvements. Estimated costs of said improvements will be provided as part of the study and will be incorporated into MSD's 10-year Capital Improvement Program.

In July 2022, MSD received responses from four firms (Geosyntec Consultants Inc, Hatch, Turbine Pros, and Clifton Science and Engineering LLC) and created a shortlist of the three most qualified candidates. The staff selection committee interviewed the shortlisted firms and carefully considered the various strengths that each offered (e.g. experience at similar facilities, qualifications of their proposed team, team's location, quality of presentation, and availability). Ultimately, Geosyntec was chosen as the most qualified firm and was awarded the project at the October 19, 2022 MSD Board Meeting.

Shortly thereafter, a primary team member/subconsultant (American Hydro) responsible for the assessment of hydromechanical equipment announced they were not able to participate in the project. Geosyntec

proposed a replacement hydromechanical engineer to satisfy the necessary scope of work. MSD's selection committee interviewed the candidate and determined that Geosyntec's team was no longer the most qualified for the project. MSD subsequently terminated its contract with Geosyntec.

Hatch, a firm that was originally ranked a close second by the selection committee was determined to be the best qualified firm to complete the project.

Hatch is a Canadian-based, international firm that has provided hydroelectric power engineering services for over 90 years in more than 110 countries. Hatch has experience completing similar assessments of hydroelectric facilities and has all necessary resources and engineering disciplines available "in-house" to complete the proposed conditional assessment.

Hatch's proposed Scope of Work mirrors that of Geosyntec's originally approved scope and is in the lump sum amount of $167,200.00. At staff's request, Optional/As-needed services totaling $57,500.00 have been included for underwater gate inspection, dam assessment, and mechanical equipment oil sampling. If the optional services are deemed necessary to supplement the assessment, then the work will be included at a later date.

Please refer to the attached documents for more detailed information.

FISCAL IMPACT: The proposed FY 23-24 budget for this project is $195,274.00.

STAFF RECOMMENDATION: Staff recommends the District enter into an engineering services contract with Hatch in the amount of $167,200.00, contingency upon a reference check by District staff and review and approval by District Counsel.

100 Sylvan Parkway
Amherst, NY, USA 14228-1146
Tel: +1 (716) 322 2660 www.hatch.com

May 5, 2023

Mr. Tim Hensley
MSD of Buncombe County, NC
Mull Building
2028 Riverside Drive
Asheville, NC 28804

Dear Mr. Hensley:

Subject: Hydroelectric Facility Condition Assessment, Rev. 2

The attached Offer for Engineering and Consultancy Services outlines the scope, approach to be used to complete the project, the deliverables, and our commercial offer.

If you would like to meet with me to clarify and further discuss any aspect of this offer, please call me at 978 609 8317.

Regards,

Ryan D. Berg, P.E., P.Eng.
Regional Manager USA | Hydropower & Dams

RDB:
Ref.: P-056061 Craggy Dam Condition Assessment_R2.docx

cc: File

Mr. Tim Hensley

Metropolitan Sewerage District of
Buncombe County, NC
May 5, 2023

OFFER FOR ENGINEERING AND CONSULTANCY SERVICES

for

Hydroelectric Facility Condition Assessment

May 5, 2023

Client Name:	Metropolitan Sewerage District of Buncombe County, NC
Project Name:	Hydroelectric Facility Condition Assessment
Hatch Contact:	Ryan D. Berg, P.E., P.Eng. Regional Manager USA | Hydropower & Dams Ryan.Berg@hatch.com Phone: 978 609 8317
Proposal Number:	P-056061, Rev. 2
Estimated Start Date:	June 2023
Estimated Completion Date:	June 2024
Cost Basis:	Cost Reimbursable Basis

Introduction

Metropolitan Sewerage District of Buncombe County, NC (MSD) is requesting the assistance of a qualified engineering company with the planned condition assessment, recommendations for improvements, and the associated Capital Improvement Program for the Craggy Dam site.

Hatch Associates Consultants, Inc. (Hatch) is pleased to provide a proposal for these services. The proposed scope of work is as detailed in the following sections that provide the work to be undertaken as part of this project.

Scope of Work

Hatch's team includes a wide range of technical experts in different fields. Hatch will assign the most appropriate expert to the project, which will maximize the value of MSD's project. Hatch will complete the work in accordance with this mutually developed Scope of Work.

Task 1 – Kickoff Meeting

The Hatch project team will participate in a project kickoff meeting with MSD to review the project scope, confirm the project schedule, and the overall project execution approach. This proposal assumes three (3) Hatch engineers attend an in-person site meeting for one full day at site and up to six (6) Hatch subject matter experts (SMEs) to attend a one hour virtual meeting.

Hatch will confirm or establish communication protocols between both Hatch and MSD and the flow of information requests to MSD's team.

Task 2 – Condition Assessment

The Hatch team will review project records and conduct a site visit to properly assess the Craggy Dam hydroelectric facilities, including a detailed condition inspection of the flume intake / gate structure, flume, power plant influent gate structure, and power plant.

Hatch expects that knowledgeable MSD staff will be on site to assist Hatch with the inspection as well as be available to provide historical operational information about the equipment such that a comprehensive condition assessment can be performed.

2.1 Data Review

The Hatch team will review existing project records, drawings, performance data, and operating records provided by MSD prior to the site visit. Hatch will create and submit specific Requests for Information (RFIs) to MSD to obtain other information as necessary after the review of the information provided to complete the initial data review process.

2.2 Site Visit

This proposal assumes three (3) Hatch engineers attending the site visit to perform the following assessments. Hatch proposes to send a mechanical engineering and an electoral engineer for five days and a civil / structural engineer for four days.

2.2.1 Flume Intake / Gate Structure

Hatch will send a Structural / Civil Engineer to site to assess the existing flume intake and gate structure. During this assessment, Hatch recommends that functional testing be performed on the gates and hoists to demonstrate proper operation.

2.2.2 Flume Assessment

Hatch will send a Structural / Civil Engineer to site to complete a visual inspection of the interior and exterior of the flume in the dewatered condition. The assessment will include a walkdown along the top of the flume, the toe of the flume (river side), and the water passage of the flume.

Assumptions:

- It is assumed the closed headgates will eliminate the flow of water into the flume with minimum acceptable leakage to provide safe access to walk down the water passage of the flume. Safe access to the flume is the responsibility of MSD.
- It is assumed that the river water level is low enough to safely walk along the toe of the flume on the river side.

2.2.3 Power Plant Influent Gate and Draft Tube Stop Log Structures

Hatch will send a Structural / Civil Engineer to site to assess the existing power plant influent gate and draft tube stop log structures. The inspection will include full travel demonstration, seal effectiveness, and consideration of options to create redundancy in the event of gate damage or failure.

2.2.4 Power Plant

Hatch will send a Mechanical (Turbine) Engineer and an Electrical (Generator) Engineer to site to assess the three power units and powerhouse.

2.2.4.1 Dewatered Assessment

The dewatered assessment will include a complete visual inspection of the turbines, bearings, oil head (unit 2), gear box, generators, balance of plant equipment, electrical systems, crane, and other auxiliary systems. In addition, the following inspections and testing will be performed:

- Dimensional inspection of the runner blade tip clearances (if accessible).
- Pole Drop Testing (if accessible)

The turbine visual assessment will include runner, discharge ring / water passage, turbine shaft, coupling, and shaft seal. Hatch will look for signs of cavitation, oil leakage, shaft seal leakage, and any other defects.

The generator visual assessment will include the rotor, stator, excitation system, terminal box, generator shaft, and couplings.

The balance of plant and electrical systems will include the governor, HPU, controls, piping, cabling, oil systems, water systems, and instrumentation.

2.2.4.2 Running Assessment

The running assessment will include the following inspections and testing and will be performed for a single unit:

- Megger Testing of Generator (IR and PI test right after the unit is shut down while winding is still hot)
- Electrical Testing of Transformer (IR temperature monitoring in operation)

2.2.4.3 Assumptions and Recommendations

- Hatch recommends that MSD perform vibration monitoring of the power unit during the running assessment testing.
- Hatch recommends that the bearings are disassembled for one unit to assess the condition of the running / bearing surfaces for at least one unit.

Task 3 – Condition Assessment – Optional Services

3.1 Dam Assessment

As an option, Hatch will assess the dam condition as can be seen from the top of the flume and from the walkway along the toe of the flume. Given the water depths upstream and downstream of the dam in normal flow conditions in conjunction with the inability to stop the flow over the spillways, it is not possible to do a visual assessment of the entire dam.

This option includes an additional day at site for the Civil / Structural Engineer during the site visit and additional hours for data review.

3.2 Underwater Inspection

Hatch will subcontract the work of an underwater inspection of the intake gate structure. This work will either be performed by a diver or a Remotely Operated Vehicle (ROV) depending on availability and site conditions.

This assessment is anticipated to require one (1) day at site for a third-party contractor to perform.

Given the water depths upstream and downstream of the dam in conjunction with the inability to stop the flow over the spillways, it is anticipated that a visual assessment of the dam with a diver or an ROV may not be possible. Further review and discussion for this inspection should be performed with the selected underwater inspector, Hatch, and MSD.

3.3 Oil Sampling

Hatch will subcontract the work for the oil sampling of the gear boxes of all three units, the runner hub of one unit, the hydraulic power units, and the transformer. The turbine guide bearings and generator bearings are assumed to be greased and therefore will not require oil sampling.

Task 4 – Condition Assessment and Recommendations Memo

Hatch will compile the results of the data collection and site assessment into a Condition Assessment and Recommendations Memo for MSD to review. A final version of this memo will be included in the Capital Improvement Recommendations Report.

Task 5 – Hydrologic Assessment

Hatch will perform a hydrologic assessment of the French Broad River at Craggy Dam and provide a Hydrologic Assessment Technical Memo.

Hatch will use flow data from USGS streamflow monitoring gauge 03451500 for the French Broad River at Asheville, NC (prioritizing data from the most recent 50-years) as well as discharge data provided by MSD, if available, to compute flow-duration curves for the dam. The flow-duration curves provide an understanding of the proportion of the time that full-power generation is possible, that partial-power generation is possible, and the prevalence of low-flow conditions where power generation is not possible.

If historical power generation records and the turbine efficiency curves are available or net head levels at the units is available, Hatch will pair the hydrologic flow data with a replaced power plant intake to provide an understanding of improved power generation that could be achieved, due to a reduction head loss, as well as the expected payback period for the improvement.

Hatch will prepare and issue a memo describing the analysis methodology, assumptions, and results. This memo will be issued to MSD for review.

Hatch has included effort for one round of comments and a re-issue of the memo as final.

Assumptions:

- MSD will provide Hatch the following information in digital, electronic format:
  - Riparian/ecological flow requirements as required by the FERC.
  - Measured headwater and tailwater levels in Excel.
  - As-built, survey, and/or construction drawings of the system
  - Historical power generation (preferably at the unit), if available
  - Turbine efficiency curves from 1984 replacement
  - Net head levels at the units, if available, for various flow regimes
- The hydraulic analysis excludes analyses such as any specific power unit efficiency analysis, efficiency optimization, evaluation of different operating scenarios, or other related analysis. These detailed analyses can be provided on request as additional services; however, indicative potential expected increases in the power unit performance for limited turbine, speed increaser, or generator component modifications or replacements with modern designs will be provided.

Task 6 –Capital Improvement Recommendations

Hatch will submit a preliminary Capital Improvement Plan (CIP) Report including the condition assessment, hydrological assessment, recommendations for improvement with probable construction cost for each improvement (AACE Class 4 – Order of Magnitude Estimate), risk analysis with priority-based list of improvements, and a cost to benefit analysis of the recommended improvements.

Hatch has included an on-site Preliminary CIP Review meeting with MSD. Hatch will present the findings and the Capital Improvement Recommendations to MSD for review and discussion. The results of this meeting will be used to develop the final Capital Improvement Plan in Task 6.

Task 7 – Capital Improvement Plan

A final Capital Improvement Plan (CIP) Report will be issued to MSD based on the results from the Preliminary CIP Report and the Review Meeting. Hatch will be available for additional virtual meetings or discussions as necessary to assist MSD after MSD's review of the final Capital Improvement Plan Report.

Deliverables

Hatch deliverables will include the following:

- Task 1 – Meeting Minutes
- Task 2 – Site Visit
- Task 3 – Underwater Inspection Report; Oil Sample Test Results
- Task 4 – Condition Assessment and Recommendations Memo
- Task 5 – Hydrologic Assessment Technical Memo
- Task 6 – Preliminary Capital Improvement Plan Report; Meeting Minutes from Preliminary CIP Review

- Task 7 – Final Capital Improvement Plan Report

Assumptions and Exclusions

The following exclusions and assumptions were made in the preparation of this proposal and apply to Hatch's scope of work as outlined above. These exclusions and assumptions are as follows:

- MSD is responsible for operating the flume intake gate, unit headgates, and unit draft tube stop logs to properly dewater the flume and power plant for safe access to perform the necessary assessments and inspections.
- MSD will provide any specific requirements for safety training in advance of the site visit such that the Hatch team can receive the training prior going to the site.
- Drawings or 3D modeling for either mechanical, electrical, or CFD type of modeling is not included.

Items Required from MSD

The following are items are required to be supplied by MSD:

- Historical Water Flow.
- Drawings, schematics, and OEM information of equipment.
- Historical operations and maintenance information.
- Rehabilitation, replacement, and modification history.
- Duty requirements for the units after refurbishment.

Schedule

Hatch assumes the following preliminary schedule for the proposed scope of work based on the anticipated start date and unit outage schedule provided by MSD. A shorter completion schedule may be possible after the completion of Task 2. Hatch welcomes the opportunity to discuss the overall project schedule with MSD to ensure that the work is performed in the time frame required.

Table 1: Preliminary Schedule

Task	Completion Date
Task 1 – Kickoff Meeting	July 2023
Task 2 – Condition Assessment	Summer / Fall 2023
Task 3 – Condition Assessment – Optional Scope	Summer / Fall 2023
Task 4 – Condition Assessment and Recommendations Memo	3 Months after Task 2 Completion
Task 5 – Hydrological Assessment Memo	With Task 4
Task 6 – Capital Improvement Recommendations	3 Months after Task 4 Completion

Task	Completion Date
Task 7 – Capital Improvement Plan Report	1 Month after MSD Review of Task 6

Additional Services

Additional services can be provided upon request. At the time of a request for additional services, Hatch will provide a cost estimate to complete the requested services. Hatch will advise MSD of schedule and cost impacts to the implementation of additional services requested.

Hatch Project Team

The following is the proposed project team for the Craggy Dam project. These project team members are all in North America. Hatch may utilize support from Chalmers and Kubek for onsite data collection.

Person	Email	Role
Ryan Berg, P.E.	ryan.berg@hatch.com	Sponsor / QA and QC
Bill Crowley, P.E.	bill.crowley@hatch.com	Project Manager, Turbine Engineer
Andrew Breighner, P.E.	andrew.breighner@hatch.com	Turbine Engineer
Muhidin Slijepcevic, P.Eng.	muhidin.slijepcevic@hatch.com	Generator Engineer
Nassim Bedrani, E.I.T.	nassim.bedrani@hatch.com	Electrical Engineer
Jerry Westermann	jerry.westermann@hatch.com	Intake Gate Engineer
Allison Lunde, P.E.	allison.lunde@hatch.com	Structural / Civil Engineer
Christian Murphy, P.E.	christian.murphy@hatch.com	BOPE / Electrical Engineer
Rauf Ahmed	rauf.ahmed@hatch.com	Controls and Automation Engineer
Donald Martin, P.E.	donald.martin@hatch.com	BOPM / Mechanical Auxiliaries Engineer
Bill Kussmann, P.E.	Bill.kussmann@hatch.com	Geotechnical Engineer
Ross Mullen, P.E.	ross.mullen@hatch.com	Water Resources Engineer

The roles, experience and qualification of the project team are as follows (complete resumes are included in Attachment C):

Ryan Berg, P.E., P.Eng. – Project Sponsor

Role: *Primary Sponsor* - Ryan will interface with MSD on commercial and technical issues.

Experience: 18+ years of experience (currently Regional Manager of USA Hydropower & Dams and a Senior Project Manager).

Qualifications:

- Current role has Ryan directly responsible for business development and client relations across the entire U.S.

- Extensive experience with mergers and acquisitions and performing due diligence activities on facilities ranging from 1 MW to 2,000 MW for investment companies.
- Experience with hydro operations and maintenance planning working for a private power producer. His professional background includes design, analysis, layout, evaluation, and management of various projects in the hydroelectric sectors. His experience includes assignments in various countries in North America, Central America, and South America.
- Responsible for the successful completion of a variety of projects, including feasibility studies, rehabilitation works, dam safety, due diligence assessments, and design/layout of both bid level and construction level greenfield hydroelectric facilities.

Bill Crowley, P.E. – Senior Mechanical Engineer

Role: *Project Manager / Project Engineer*

Experience: 35+ years of experience in the design, manufacturing, installation, and assessment of hydroelectric power equipment.

Qualifications:

- Extensive knowledge of all types of Turbines (Kaplan, Francis, Mixed Flow, Pump Turbines, Pelton, Pit, Bulb, and Saxo style ranging from 1 MW to 500+ MW in output); shutoff valves (butterfly and spherical)
- General knowledge of generators (synchronous, variable speed, motor/generators) automation, controls, balance of plant, and excitation equipment.

Andrew Breighner, P.E. – Hydropower Specialist

Role: *Project Engineer –Turbines*

Experience: 10 years of experience with design and support of hydroelectric turbines and generators.

Qualifications:

- Lead Engineer and Chief Project Engineer experience for hydroelectric modernization projects.
- Extensive mechanical design experience with fixed blade runners and impellers.
- Manufacturer and EPC (Engineer Procure Construct) experience with Voith Hydro.
- Engineering supervision experience for after-market sales and services.

Allison Lunde, P.E. – Regional Manager, Hydropower & Dams

Role: *Project Engineer –Civil / Structural*

Experience: 12 years of civil and structural engineering experience in reinforced concrete, reinforced masonry, and steel structures.

Qualifications:

- Design of bulkhead and dewatering systems, head gates, concrete repairs, and structural steel upgrades.
- Dam safety and inspection.

Ross Mullen, P.E. – Water Resources Engineer

Role: *Hydrology and Hydraulics Subject Matter Expert*

Experience: 12 years of experience with analysis and design of dams and spillways.

Qualifications:

- Hydraulic Engineer and Designer of several hydroelectric modernization projects and dam replacements.
- Extensive experience with hydrologic flood-frequency analysis and hydraulic design.
- Engineering experience with the FERC on acceptable risk profiles.

Muhidin (Dino) Slijepcevic, P.Eng. – Principal Electrical Engineer

Role: *Project Engineer – Generators*

Experience: 40 years of design and OEM experience.

Qualifications:

- Background in managing and executing multiple complex projects for hydro generation, with the experience of directing all technical aspects of project from offering to customer through to project execution.
- Designer for stator winding/field winding refurbishment (while working with Voith Hydro for over 22 years)
- Performing the role of Owner Engineer for FBC/Waneta, U3MH / Pointe du Bois for 8 units replacement trough design review, manufacturing QA, installation inspection, witnessing commissioning and acceptance testing.

Bill Kussmann, P.E. (North Carolina) – Senior Geotechnical Specialist

Role: *Geotechnical Engineer*

Experience: 24 years of experience in geological and geotechnical investigations, engineering evaluations, and design.

Qualifications:

- Design for a variety of hydroelectric, renewable energy, and commercial/industrial projects. Designs have included embankment buttresses, embankment reinforcement, filter blankets, under seepage collection systems, cut-off walls, and grouting programs to improve levee and dam stability on numerous FERC-regulated and USACE projects.
- Performed soil investigations, seepage analyses, stability analyses, and site reviews for numerous operational hydropower dams and existing and proposed levee embankments.
- Specializes in evaluating site conditions and performing geotechnical analysis to have final construction solutions benefit the client's overall goals.

Christian Murphy, P.E. – Electrical Engineer

Role: *BOPE / Electrical Engineer*

Experience: 9 years of experience

Qualifications:

- Experience in balance of plant modification projects
- 9 years of experience in engineering and design in the electrical power industry with a focus in Hydropower. Experience includes projects from inception to completion including feasibility studies, conceptual design services, detailed design services, procurement support, and construction support.
- Projects include medium & low voltage power distribution, underground power distribution, substation design, balance of plant modification, UPS design, lighting design, Instrumentation design, cost estimation, specification development, distribution system operations, and drafting technical reports.
- Experience with computer modelling utilizing popular software tools such as ETAP and SKM to perform short circuit studies, ground map design, load flow studies, arc flash studies, and protection & coordination studies.

Rauf Ahmed – Electrical Engineer

Role: *Controls and Automation Engineer*

Experience: 29 years of experience (26 years in contracting/consulting firms and 3 years in an electric utility)

Qualifications:

- Experience in the field of generation, transmission and distribution systems, water control structures and industrial process instrumentation and control
- Areas of expertise include project management, design engineering studies, concept engineering, detail engineering, cost estimates, control and protection systems for 75/500/380/230/115-kV ac stations, hydro stations and water control structures, HVdc converter station layouts, 230 and 115-kV transmission lines, HVDC ground electrodes, grounding systems, 230-kV and 115-kV power cable systems, overhead and underground distribution systems, industrial instrumentation and control systems, and SCADA and communication systems for various power utilities.

Donald Martin Jr., P.E. – Senior Mechanical Engineer

Role: *BOPM / Mechanical Auxiliaries Engineer*

Experience: 26 years of experience

Qualifications:

- Hydropower & Dams Business Unit lead in Hatch's Amherst NY office. Responsibilities include Business Development, Project Management and Engineering Manager.
- Experience includes industrial gas plants, machine design, structural design, and hydroelectric power plants.
- Expertise with due diligence of hydroelectric stations.

- Experience with dozens of technical assessments involving nearly 200 hydroelectric, wind and solar plants where his role has included Project Management, OPEX analysis, Capital Expenditure (CAPEX), cost estimating, planning and technical assessment of assets.

Hatch may involve other experts if deemed necessary. Hatch employs, for example: FEA experts, CFD experts, welding experts, experts in design of hydraulic steel structures (ASME boiler vessel code), generator experts, etc.

Subcontractors

Hatch intends to select from the following subcontractors to assist with the condition assessment.

Company	Contact Information	Role
J.F. Brennan Company, Inc.	Adam Thorson Dive Project Supervisor athorson@jfbrennan.com Corporate Headquarters 818 Bainbridge Street La Crosse, WI 54603 T: 608.519.5288 C: 507.450.8366	Underwater Inspection Specialist (Divers)
ASI Marine	Scott E. Waite Certified Hydrographer swaite@asi-group.com 40 Centre Drive, Suite 300 Orchard Park, NY 14127 T: 716.667.3507 C: 716.445.1981	Underwater Inspection Specialist (ROV)
Chalmers and Kubeck	Ken Hostler khostler@candk.com 1050 Industrial Blvd Watkinsville GA 30677 T: 706.493.8768	Oil Sampling and Possible On-Site Data Collection Support

Commercial Offer

Overview

Hatch is pleased to provide the following commercial offer to Metropolitan Sewerage District of Buncombe County, NC for the professional services (the "**Services**") detailed herein.

Estimated Cost of Services

The overall cost is estimated to be USD $167,200 with optional scope of Task 3 as indicated below on a reimbursable cost basis, exclusive of applicable taxes and adjustment for variations. A summary of the cost reimbursable estimate is provided in the Table below:

Table 2: Estimated Breakdown of the Cost Estimate

Task	Level of Effort (hrs)	Expenses ($USD)	Estimated Cost ($USD)
Task 1 – Kick-Off Meeting[1]	53	$5,000	$17,500
Task 2 – Condition Assessment	227	$7,400	$54,700
2.1 Data Review	*98*		*$22,800*
2.2 Site Visit	*129*	*$7,400*	*$31,900*
Task 3 – Condition Assessment – Optional Scope	14	$54,400	$57,500
3.1 Dam Assessment	*14*		*$3,200*
3.2 Underwater Inspection		*$34,500*	*$34,500*
3.3 Oil Sampling		*$19,800*	*$19,800*
Task 4 – Condition Assessment and Recommendations Memo	76		$15,400
Task 5 – Hydrological Assessment Memo	30		$5,900
Task 6 – Capital Improvement Recommendations	236	$5,000[2]	$60,900
Task 7 – Capital Improvement Plan Report	53		$12,800
TOTAL BASE SCOPE	**675**	**$17,400**	**$167,200**
TOTAL BASE SCOPE WITH OPTIONAL TASK 3	**689**	**$71,800**	**$224,700**

1) *Expenses include travel for three (3) engineers for full day on site meeting with travel and a one (1) hour virtual meeting with up to six (6) SME's.*
2) *Includes travel for on-site meeting with MSD.*

The fee breakdown is provided for indicative purposes only. Depending on type, quantity, format, and completeness of information/data available for Hatch's review, as well as on actual findings or specific requirements from the Client during the assignment, fees may vary. In the case required additional budget beyond the herein presented initial total fees estimate is needed, it will be timely submitted to the Client for review and approval.

Basis of Compensation

As full compensation for the services, Hatch will be paid the sum of labor billings and reimbursable expenses incurred.

Schedule of Rates

The applicable Schedule of Rates for reimbursable personnel labor and Project expenses incurred in performing Services is set out in **Attachment B** attached hereto.

Travel and Related

Compensation for chargeable expenses incurred by Hatch in the interests of the project and not provided for within the charge-out rates, such as travel and related costs including out-of-pocket disbursements, will be charged at cost, plus 5%.

Subconsultants

Hatch has included the estimated cost for the proposed services of Subconsultants in Table 2. These Subconsultants will be charged at cost, plus an additional markup of 10% to cover administration services.

Additional Services

If additional scope is needed, then Hatch will prepare a Project Change Authorization (PCA), which will provide an estimate of cost of the change and once agreed to and signed, Hatch will commence the work on this scope addition.

Invoicing & Payment

Invoices for reimbursable time and expenses will be invoiced on a monthly basis in arrears with payments due NET 30 days from the date of each invoice.

Contract Terms and Conditions

Hatch will perform the Services detailed in this offer in accordance with the Professional Services Terms and Conditions included in **Attachment A**, on which this proposal has been expressly based.

Validity

This offer remains valid for a period of 90 days from the date of this letter.

Acceptance of Offer

Metropolitan Sewerage District of Buncombe County, NC accepts this proposal and requests Hatch to undertake the assignment as detailed above. This letter, the enclosed proposal including the Statement of Services and attached Professional Services Terms and Conditions and Hatch Schedule of Rates form the whole agreement between Metropolitan Sewerage District of Buncombe County, NC and Hatch notwithstanding anything to the contrary in any purchase orders issued for administrative convenience.

Signed on behalf of Hatch Associates Consultants, Inc. by:	Signed on behalf of Metropolitan Sewerage District of Buncombe County, NC by:
_____	_____
Name: _____	**Name:** _____
Title: _____	**Title:** _____
Date: _____	**Date:** _____

Mr. Tim Hensley

Metropolitan Sewerage District of
Buncombe County, NC
May 5, 2023

Attachment A – Terms and Conditions

CLAUSE 1 AGREEMENT

1.1 Unless a written agreement is entered into, Client's acceptance of a proposal (the "*Proposal*") from the Hatch company submitting the Proposal ("*Hatch*") or a request by Client for some or all of the services included in the Proposal, constitutes a binding contract between Client and Hatch (the "*Agreement*"). The Agreement incorporates and is subject to these Terms and Conditions and the terms and conditions included in the Proposal, including the description of the services to be provided by Hatch (the "*Services*"). If there is any conflict between the Proposal and these Terms and Conditions, these Terms and Conditions will govern. Any terms appearing on any orders or other documents produced by or on behalf of Client are excluded unless they have been specifically accepted in writing by Hatch.

CLAUSE 2 HATCH SERVICES AND RESPONSIBILITIES

2.1 Hatch will (a) perform the Services with due care, skill and diligence in accordance with the standard of care normally exercised by professionals providing similar services under similar circumstances, and (b) reperform at its cost any Services that fail to comply with this standard, provided that Hatch may instead opt to refund to Client all amounts paid in respect of such Services if it determines that reperformance is not practicable.

2.2 Hatch will comply with all applicable laws and site policies and procedures, including those relating to safety and security; but, unless otherwise agreed, Hatch is not responsible for overall site safety or security at any Client premises or the project site.

2.3 Unless otherwise agreed, Hatch can rely without verification on all information provided by Client or by third parties on behalf of Client.

2.4 Hatch will have in effect for the duration of the Services (a) workers compensation coverage in accordance with statutory requirements, (b) commercial general (or public) liability insurance ($5,000,000 per occurrence); and (c) automobile liability insurance ($5,000,000 per occurrence).

CLAUSE 3 CLIENT RESPONSIBILITIES

Client will (a) make available to Hatch all information, documents and assistance required in connection with the Services, (b) make decisions and provide approvals in a timely manner and obtain all necessary project authorisations and permits, (c) notify Hatch if it becomes aware of any matter that may change the scope, timing or complexity of the Services, (d) act reasonably and in good faith, (e) comply with applicable laws, and (f) maintain insurance to limits which are normal and customary in the circumstances and Client, on behalf of itself and its insurers, waives all rights of subrogation against Hatch for, and releases Hatch from any liability for damage to Client's property to the extent that Client is compensated for such damage under an insurance policy.

CLAUSE 4 INVOICING, PAYMENT AND TAXES

4.1 Unless otherwise provided in the Proposal and subject to Clause 4.2, (a) Services (including any additional services provided at the request of Client or pursuant to Clause 4.5) and related costs incurred by Hatch in connection with the Services will be charged to Client in accordance with Hatch's schedule of rates or the amount agreed in the Change Order, (b) amounts invoiced to Client by Hatch are due and payable within the period stated in Hatch's schedule of rates or, if not so stated, within 30 days of receipt of invoice by Client, and (c) interest will be paid on past due amounts at the rate stated in Hatch's schedule of rates.

4.2 If an advance payment or security deposit amount is specified in the Proposal, such amount will be paid by Client prior to Hatch commencing the Services and will be held by Hatch as security for payment. Hatch may apply these funds against any amounts owing by Client to Hatch and will return any remaining amounts to Client upon receiving full payment for the Services.

4.3 Hatch's rates are exclusive of all taxes, duties, royalties, levies and other governmental or regulatory charges, other than taxes on payroll and Hatch's net income in the Jurisdiction. If any such taxes, duties, royalties, levies or charges are levied on or applicable to amounts payable to Hatch, they will be borne by Client and (a) if Hatch is required to pay any such taxes, duties, royalties, levies or charges, the amount of such payments will be reimbursed to Hatch by Client, and (b) if they are required to be withheld or deducted from amounts payable to Hatch, the amounts payable will be grossed up so that Hatch receives the entire amount that is due pursuant to the terms of the Agreement.

4.4 If Client disputes any portion of an invoice, it will pay those amounts that are not in dispute and notify Hatch in writing of the reasons for the dispute within 10 days of receiving the invoice. Failure to notify Hatch of the dispute within the required time will be treated as acceptance of the invoice. If it is determined that any amounts in dispute should have been paid at the time it was invoiced, then Client will promptly pay such amount, together with interest at the rate set out in Clause 4.1.

4.5 Hatch shall be entitled to a Change Order in the event of any Scope Changes and shall not be required to proceed with any change to the Services in advance of the execution by both parties of the relevant Change Order.

CLAUSE 5 LIABILITY AND INDEMNITY

5.1 To the maximum extent permitted by law and notwithstanding and superseding anything to the contrary in the Agreement:

(a) Clause 2.1(a) sets out Hatch's sole warranty respecting the Services and Clause 2.1(b) sets out Hatch's sole obligation and Client's sole remedy in connection with any breach of Clause 2.1(a) (and Client will not otherwise have any recourse against Hatch in connection with any errors or omissions in the Services);

(b) subject to Section 5.2, the aggregate liability of Hatch arising in connection with the Agreement is limited to (i) the amount of the professional fees paid to Hatch pursuant to the Agreement up to $100,000, plus (ii) 10% of such fees paid in excess of $100,000; provided that in no event will Hatch's aggregate liability exceed $1,000,000;

(c) Hatch has no liability to Client for any losses, damages or costs that can be construed as an indirect, special, punitive or consequential losses, damages or costs; and

(d) any claim, action or proceeding against Hatch in connection with the Agreement, including any warranty claims under Clause 2.1, must be made within 12 months of the earlier of completion of the Services and termination of the Agreement.

5.2 Hatch's liability for claims or losses covered by the insurance policies referred to in Clause 2.4 is limited to the proceeds of insurance up to the amounts specified in Clause 2.4.

5.3 Client indemnifies, defends and holds harmless Hatch for any claims, actions, proceedings, liabilities, losses, damages or costs that Hatch suffers or incurs (a) in connection with the Services and which result other than from a breach of the Agreement by Hatch, (b) as a result of any breach of the Agreement by Client, (c) as a result of site conditions that were unknown to Hatch at the time of entering into the Agreement, or (d) as a result of third party use of, or reliance on, any information or deliverable provided by Hatch to Client in connection with the Services.

CLAUSE 6 USE AND OWNERSHIP OF INFORMATION

6.1 Each party retains title to all intellectual property (including all patents, trademarks, copyright, trade secrets and know how) owned or possessed by it or any of its affiliates and used by it in fulfilling its obligations under the Agreement, including any modifications or improvements made thereto ("*Background IP*"). All new and original intellectual property created by Hatch during the course of performing the Services ("*Project IP*") is the property of Hatch. Hatch grants Client a non-exclusive, non-transferable and, unless otherwise agreed, royalty-free license to use (a) any Hatch Background IP used in the performance of the Services but only to the extent required to use any deliverables provided by Hatch for the purpose for which they have been provided and (b) Project IP for any purpose whatsoever; provided that Client has no right to receive or use proprietary information or coding that is embedded in Hatch's project systems, software or electronic copies of deliverables and Client will not modify any Hatch deliverables unless it has first removed Hatch's name and logo from the deliverable.

6.2 Upon receipt of full payment for the related Services and subject to the other provisions of this Clause 6, all reports, drawings and other deliverables provided to Client by Hatch will become the property of Client.

6.3 Any information or deliverable provided by Hatch to Client in connection with the Services is provided solely for Client's use and for the specific purpose for which the Services were engaged. Unless otherwise agreed by Hatch in writing, in no case will (a) any such information or deliverable be made publicly available or used in connection with any financing, sale or investment transactions, or (b) Hatch's name be used in any of Client's public disclosure or filings.

6.4 Each party will keep confidential all Confidential Information disclosed to it by the other party; provided that (a) Hatch is able to disclose Client's Confidential Information to those persons who need to know such information for purposes that relate to the performance of the Services, (b) Client is able to disclose Hatch's Confidential Information to the extent required in connection with the purpose for which the information was disclosed, and (c) either party is able to disclose Confidential Information where it is required to be disclosed by law, provided that the receiving party immediately notified the disclosing party of the requirement to disclose and allowed the disclosing party to take reasonable steps to lawfully resist or narrow the requirement to disclose the Confidential Information. Except as specifically provided herein, neither party will acquire any right, title or interest in or to the Confidential Information of the other party.

6.5 "*Confidential Information*" means any information in any form disclosed by or on behalf of one party to the other party at any time before or after the execution of the Agreement in connection with the Services; excluding only information which (a) was at the time of disclosure or thereafter became part of the public domain through no act or omission of the receiving party, (b) became available to the receiving party from a third party who did not acquire such confidential information under an obligation of confidentiality either directly or indirectly to the disclosing party, or (c) was known to the receiving party at the time of disclosure by the disclosing party and such knowledge can be demonstrated by written records that were in existence at the time of disclosure.

CLAUSE 7 TERMINATION AND SUSPENSION

7.1 Client may suspend the Services or terminate the Agreement for its convenience on 30 days prior written notice to Hatch; provided that, if the aggregate duration of all suspensions under the Agreement exceeds 60 days, Hatch will have the right to terminate the Agreement.

7.2 Either party may terminate the Agreement immediately if anything happens to the other party that reasonably indicates that there is a significant risk that the other party is or will become unable to pay its debts generally as they come due.

7.3 Either party is entitled to terminate the Agreement on 14 days prior written notice to the other party in the event that the other party is in substantial default under the Agreement and such default has not been corrected or reasonably commenced to be corrected within 14 days following notice of such default. Hatch may, by providing 5 days prior notice to Client, suspend Services if Client is in breach of Clauses 3 or 4.

7.4 In the case of any suspension or termination of the Agreement, Client will pay Hatch for all Services provided and costs incurred up to the effective date of suspension or termination, including all reasonable demobilization costs.

7.5 Hatch makes no warranty and has no continuing obligations in respect of any deliverables that are incomplete as of the date of any termination or suspension.

CLAUSE 8 NON-SOLICITATION

Neither party will, during the term of the Agreement or for 12 months thereafter, either directly or indirectly on its own behalf or jointly with or on behalf of any other person, solicit, engage or employ any employee or independent contractor of the other party (or any of its affiliates) that has been involved in the provision of Services or with whom the party has otherwise had contact in connection with the Agreement.

CLAUSE 9 DEFINITIONS AND INTERPRETATION

9.1 Reference to (a) "*affiliate*" means with respect to a party, one or more entities that control, are controlled by, or are under common control with, the party, (b) "*Change Order*" means a written agreement between the parties amending the terms of the Agreement, including price and schedule, to the extent fair and reasonable in the circumstances as a result of a Scope Change, (c) "*costs*" means any and all costs and expenses, including reasonable legal fees, (d) "*force majeure*" means acts of God, strikes, lockout, other industrial action, war or civil disturbance, terrorism, unusually inclement weather, storm, flood, earthquake, lightning, fire, explosion, nuclear or radioactive contamination, epidemics or pandemics, governmental action or inaction, extraordinary market conditions affecting the availability of labour, late or inadequate execution of work or supply of goods by third persons and any other event beyond the reasonable control of the affected party, (e) "*Hatch's schedule of rates*" means Hatch's standard hourly rates and reimbursable charges as notified by Hatch from time to time, provided that any changes to the schedule of rates will be communicated to Client before they take effect and will not occur more than once every six months, (f) "*liability*" includes any and all liability whatsoever, whether arising under the law of contract, tort (including negligence), equity, statute or otherwise, whether arising in connection with the performance or non-performance of the Services or otherwise in connection with the Agreement and whether to Client or other persons, and "*liable*" has a corresponding meaning, (g) "*Scope Changes*" means (i) any change to the Services, or (ii) any other event or circumstance that is outside of Hatch's control and impacts the timing or sequencing of, or work effort required by Hatch to complete, the Services (typically by requiring rework or by preventing Hatch from performing Services in the manner or sequence originally planned), (h) "*site conditions*" means any conditions in, on, under or around the project site that affect the project or the performance of Services, including any plant and subsurface conditions and any hazardous substances, waste or materials, (i) "*Jurisdiction*" means the jurisdiction in which Hatch's contracting office is located, and (j) "*$*" means the currency of the Jurisdiction where it is in Canada or Australia and, in all other cases, it is a reference to US dollars.

9.2 If any provision of the Agreement is held to be void, illegal or unenforceable, then (a) it is severed and the rest of the Agreement remains in force, and (b) the parties will replace the provision with one that is in accordance with applicable law and as close as possible to the parties' original intent. Any rules of contract interpretation that result in the Agreement being construed contrary to the interests of either party do not apply in the interpretation of the Agreement.

CLAUSE 10 GENERAL

10.1 The Agreement will be governed by and construed in accordance with the laws of the Jurisdiction, without giving effect to conflict of law considerations. All disputes will be submitted to senior management for discussion. If the parties are unable to resolve a dispute through such discussions, either party may submit the dispute to the International Chamber of Commerce ("ICC") for resolution in accordance with its rules then in force. The arbitration will be held in English and at the location of Hatch's contracting office. The arbitration panel will consist of one arbitrator selected by the ICC in accordance with its rules. Any arbitration award will be final and binding on the parties without any right of appeal. The unsuccessful party will bear the costs of arbitration. No legal proceedings may be commenced by either party in connection with the Agreement or the Services other than in accordance with this Clause; provided that either party may apply to a court of competent jurisdiction for interlocutory relief during the course of such proceedings or to enforce any order or award obtained in accordance with this Clause.

10.2 The Agreement represents the entire agreement between the parties regarding the subject matter hereof and supersedes all prior representations, understandings or agreements; provided that, if the parties have previously entered into a confidentiality (or similar) agreement regarding the subject matter hereof, such agreement will survive and Clauses 6.4 and 6.5 will be of no force and effect. Amendments to the Agreement are effective only if executed in writing by authorized representatives of both parties.

10.3 Neither party may assign (other than to its affiliate) the Agreement or any interest therein, in whole or part, without the prior consent of the other party. The Agreement will enure to the benefit of and be binding upon the parties and their respective successors and permitted assigns.

10.4 Neither party will be considered to be in breach of its obligations under the Agreement, except obligations to make payment, to the extent that performance is prevented or delayed by force majeure. Each party will use best efforts to overcome any force majeure as soon as possible.

10.5 The limitations and exclusions on liability expressed in the Agreement will apply even in the case of the fault, negligence or strict liability of the party who is the beneficiary of the clause, and will extend to the officers, directors, employees, agents, representatives, subconsultants and affiliates of such parties.

10.6 Any notice, consent or other communication given hereunder will only be deemed to have been given if it is in English, in writing and is sent to the recipient's authorized representative at the usual business address of the recipient by (a) registered mail, (b) fax, (c) e-mail (but only when receipt is confirmed in writing by reply e-mail or otherwise) or (d) personal delivery for which a receipt is obtained. Notice given by fax, personal delivery or e-mail will be deemed to have been given on the business day following delivery. Notice given by mail will be deemed to have been given on the fifth business day after mailing.

10.7 No waiver by either party of any breach of the Agreement will be binding unless made in writing and any such waiver will extend only to the specific breach waived and not to any future breach.

10.8 Hatch is an independent contractor in performing the Services. Nothing in the Agreement will create or will be construed so as to create the relationship of principal and agent between Client and Hatch.

10.9 The provisions of Clauses 1, 4, 5, 6, 7.4, 8 and 10 survive the termination of the Agreement.

Mr. Tim Hensley

Metropolitan Sewerage District of
Buncombe County, NC
May 5, 2023

Attachment B – Schedule of Rates

Schedule of Standard Country Rates
USA

	Per Hour
Principals	297
Senior Consultants	297
Engineering, Project, and Construction Managers	269
Consultants	248
Specialists and Supervisors	230
Senior Engineers and Technologists	206
Engineers	174
Intermediate Engineers	156
Junior Engineers	142
Technologists	170
Senior Designers and Technicians	158
Designers and Technicians	142
Intermediate Designers and Technicians	124
Junior Designers and Technicians	98
Purchasing Agents and Senior Expediters	126
Technical Assistants	111
Buyers and Expediters	96
Administrative Specialists	102
Project Support Coordinators	91
Project Support Technicians	81
Students	60

Currency: United States Dollars

Time Charges:
All time expended on the assignment, whether in our office, at the client's premises, in transit, or elsewhere, is chargeable, including the time of staff engaged in the preparation of documents such as reports and specifications.

Systems Expense Recovery:
Secure global cloud-based systems, encompassing platform charges, IT infrastructure, network connectivity, hardware, system licence fees, design and analysis tools are included in above rates.

Expenses and Disbursements:
Travel, living expenses, personal protective equipment, site office costs for resident staff and project expenses will be charged at cost plus plus 5%. Project expenses include capital procured equipment, project delivery software (at individual daily rates) and other items not otherwise listed. Sub-consultant expenses will be charged at cost plus 10%.

Reimbursement for general expenses on assignments including telecommunications, reproductions, printing, office supplies and courier charges are included in the above rates.

Invoicing and Payment:
Fees and expenses are invoiced monthly and are due and payable within 14 days or other agreed duration. The above rates are exclusive of all taxes and other regulatory charges, which will be added to the invoice when applicable. Interest will be charged on any past due amounts at the lower of: (a) the highest permissible rate, or (b) 12% per annum, charged at 1% per month from the due date to the date of payment. Client usage of portals for submission of invoices with mandated supporting documents and details will result in a processing fee charge equivalent to 2% of the invoiced fee value.

Process and Technology Experts:
Process and Technology experts are charged at specific individual rates.

Overtime:
Overtime will be charged at 1.5 times the above rates.

Terms and Conditions:
The above rates are based on Hatch standard terms and conditions.

Scheduled Revision: The next revision of this Schedule of Rates will be effective July 1st, 2023.

Attachment C – Resumes

Ryan D. Berg

Hydropower and Dams Regional Manager – USA

Education

B.S., Civil and Environmental Engineering, Utah State University

M.S., Civil and Environmental Engineering, Utah State University

Professional Registrations

Oregon P.E. – No. 84631PE

California P.E. – No. C78565

New York P.E. – No. 100358-1

Professional Engineer, New Brunswick, Canada, No. L4923

Summary of Experience

Ryan is currently a Regional Manager of U.S.A. Hydropower and Dams for Hatch and a Senior Project Manager with more than 15 years of experience. He has extensive with mergers and acquisitions and performing due diligence activities on facilities ranging from 1 MW to 2000 MW for investment companies. Ryan also has experience with hydro operations and maintenance planning working for a private power producer. His professional background includes design, analysis, layout, evaluation and management of various projects in the hydroelectric sectors. His experience includes assignments in various countries in North America, Central America and South America. Ryan has been responsible for the successful completion of a variety of projects, including feasibility studies, rehabilitation works, dam safety, due diligence assessments, and design/layout of both tender level and construction level greenfield hydroelectric facilities.

Relevant Experience

Project Manager, Hydro Portfolio Due Diligence, Brazil. Project Manager responsible for an operational concession due diligence review of a portfolio of four existing operational hydroelectric projects located in the country of Brazil with a total capacity of 2,000 MW. Assessed potential generation versus historical generation, reviewed licensing conditions, environmental permitting and compliance, evaluated the potential of generation upgrades and/operational improvements and assessed life extension work and future capital improvements for the portfolio. Developed annual capital improvement

costs and operational costs for the portfolio for a period of 50 years. Worked in conjunction with internal business development and mergers and acquisitions groups to formulate business proposals and financial analysis to present to the company board of directors for acquisition authorization.

Senior Project Manager, Hydro Asset Management, Mozambique. Senior Project Manager responsible for the development of an asset management program for an existing hydroelectric portfolio. Project is currently ongoing.

Senior Project Manager, Refinancing Hydro Portfolio Due Diligence, USA. Senior Project Manager responsible for a refinancing review of an existing pump storage hydroelectric facility located in the USA with a total capacity of 1000 MW. Assessed potential generation versus historical generation, reviewed licensing conditions, environmental permitting and compliance, evaluated the potential of generation upgrades and/operational improvements and assessed life extension work and future capital improvements for the portfolio. Developed annual capital improvement costs and operational costs for the portfolio for a period of 50 years. Worked in conjunction with external financiers to formulate business needs and financial analysis to present to the client's board of directors.

Senior Project Manager, Hydro Portfolio Due Diligence, USA. Senior Project Manager responsible for an acquisition due diligence review of an existing pump storage hydroelectric facility located in the USA with a total capacity of 800 MW. Assessed potential generation versus historical generation, reviewed licensing conditions, environmental permitting and compliance, evaluated the potential of generation upgrades and/operational improvements and assessed life extension work and future capital improvements for the portfolio. Developed annual capital improvement costs and operational costs for the portfolio for a period of 50 years. Worked in conjunction with external business development and mergers and acquisitions groups to formulate business proposals and financial analysis to present to the client's board of directors for acquisition authorization.

Santa Maria 82 Hydroelectric Project, Panama. Project Manager for a greenfield development of 28 MW along the Santa Maria River. Projects consisted of pre-feasibility, feasibility, final design, and detailed construction design and tender bidding documentation. Project will included a hybrid 24 meter high earthen embankment and RCC concrete dams, diversion canal, 7 taintor gates, intake, tailrace and powerhouse with three new vertical Kaplan turbines and reservoir operations protocols and 18.5 km of high voltage transmission lines. Responsibilities also included environmental analyses, consultation with resource agencies and transmission line planning.

Buenavista Hydroelectric Complex Project, Columbia. Project Manager for a greenfield development of a 160 MW project along the Rio Margua. This project is currently in the early design stages. The project will consist of two project in series (50 MW and 110 MW), and will include 10 km of tunnels and necessary diversion works and 15 km of high voltage transmission lines. Responsibilities also include environmental analyses consultation with resource agencies and transmission line planning.

Boott Hydro Pneumatic Crest Gate Project, Lowell, MA. Project Manager responsible for the detailed construction design and construction of 970 feet of Obermeyer type pneumatic gates. System compromised of five operable zones without the use of intermediate piers for support. Pawtucket Dam is one of the oldest operating masonry block dams in North America and is a vital diversion structure for power generation. Detailed analyses included the stability of the 150 year old dam, design of new Obermeyer bladder system without intermediate piers for support and gate sealing and the development of special cofferdams to aid in the construction of the gates. Project currently under construction and is expected to be complete by the end of 2017.

Project Manager, Hydro Portfolio Due Diligence, Panama. Project Manager responsible for a due diligence review of a portfolio of one existing operational hydroelectric projects located in the country of Panama with a total capacity of 14 MW. Assessed potential generation versus historical generation, reviewed licensing conditions, environmental permitting and compliance, evaluated the potential of generation upgrades and/operational improvements and assessed life extension work and future capital improvements for the portfolio. Developed annual capital improvement costs and operational costs for the portfolio for a period of 50 years. Worked in conjunction with internal business development and mergers and acquisitions groups to formulate business proposals and financial analysis to present to the company board of directors for acquisition authorization.

Project Manager, Sacachispas Hydroelectric Project, Uruguay. Project Manager for a greenfield development of 50 MW run of river facility located on the Rio Negro in Uruguay. Project consisted of pre-feasibility and feasibility study as we are waiting preliminary approval from the government to continue with the project. Project will included a 15 meter high RCC concrete dam, 10 taintor gates, intake, tailrace and two powerhouse with six new "S" type Kaplan turbines and 10 km of high voltage transmission lines. Responsibilities also included environmental analyses, consultation with resource agencies and transmission line planning.

Project Manager, Hydro Portfolio Due Diligence, Columbia. Project Manager responsible for a due diligence review of a portfolio of four greenfield hydroelectric projects located in the country of Columbia with a total capacity of 69 MW. Assessed potential generation, reviewed licensing conditions, environmental compliance and potential generation limitations. Developed annual capital improvement costs and operations and maintenance costs for a period of 50 years for the portfolio.

Project Manager, Hydro Portfolio Due Diligence, New York, USA. Project Manager responsible for a due diligence review of a portfolio of hydro two projects located in New York State with a total capacity of 16.6 MW. Assessed potential generation versus historical generation, reviewed licensing conditions, environmental permitting and compliance, evaluated the potential of generation upgrades and/operational improvements and assessed life extension work and future capital improvements for the portfolio. Developed annual capital improvement costs and operational costs for the portfolio for a period of 50 years. Worked in conjunction with internal business development and mergers and acquisitions groups to formulate business proposals and financial analysis to present to the company board of directors for acquisition authorization.

Project Manager, Hydro Portfolio Due Diligence, Eastern United States, USA. Project Manager responsible for a due diligence review of a portfolio of hydro 10 projects located in the Eastern United States with a total capacity of 86 MW. Assessed potential generation versus historical generation, reviewed licensing conditions, environmental permitting and compliance, evaluated the potential of generation upgrades and/operational improvements and assessed life extension work and future capital improvements for the portfolio. Developed annual capital improvement costs and operational costs for the portfolio for a period of 50 years. Worked in conjunction with internal business development and mergers and acquisitions groups to formulate business proposals and financial analysis to present to the company board of directors for acquisition authorization.

Project Manager, Hydro Portfolio Due Diligence, Massachusetts, USA. Project Manager responsible for a due diligence review of a portfolio of hydro four projects located in Massachusetts with a total capacity of 7.2 MW. Assessed potential generation versus historical generation, reviewed licensing conditions, environmental permitting and compliance, evaluated the potential of generation upgrades and/operational improvements and assessed life extension work and future capital improvements for the portfolio. Developed annual capital improvement costs and operational costs for the portfolio for a

period of 50 years. Worked in conjunction with internal business development and mergers and acquisitions groups to formulate business proposals and financial analysis to present to the company board of directors for acquisition authorization.

Project Manager, Hydro Portfolio Due Diligence, Pennsylvania, USA. Project Manager responsible for a due diligence review of a portfolio of hydro two projects located in New York State with a total capacity of 38.4 MW. Assessed potential generation versus historical generation, reviewed licensing conditions, environmental permitting and compliance, evaluated the potential of generation upgrades and/operational improvements and assessed life extension work and future capital improvements for the portfolio. Developed annual capital improvement costs and operational costs for the portfolio for a period of 50 years. Worked in conjunction with internal business development and mergers and acquisitions groups to formulate business proposals and financial analysis to present to the company board of directors for acquisition authorization.

Project Manager, Hydro Portfolio Due Diligence, Louisiana, USA. Project Manager responsible for a due diligence review of a portfolio of one greenfield hydroelectric projects located in Louisiana with a total capacity of 70 MW. Assessed potential generation, reviewed licensing conditions, environmental compliance and potential generation limitations. Developed capital improvement costs for the portfolio. Developed annual capital improvement costs and operational costs for the portfolio for a period of 50 years. Worked in conjunction with internal business development and mergers and acquisitions groups to formulate business proposals and financial analysis to present to the company board of directors for acquisition authorization.

Project Manager, Hydro Portfolio Due Diligence, Idaho, USA. Project Manager responsible for a due diligence review of a portfolio of hydro a project located in Idaho with a total capacity of 38.5 MW. Assessed potential generation versus historical generation, reviewed licensing conditions, environmental permitting and compliance, evaluated the potential of generation upgrades and/operational improvements and assessed life extension work and future capital improvements for the portfolio. Developed annual capital improvement costs and operational costs for the portfolio for a period of 50 years. Worked in conjunction with internal business development and mergers and acquisitions groups to formulate business proposals and financial analysis to present to the company board of directors for acquisition authorization.

Senior Project Engineer, Villanueva Solar, Mexico. Senior Project Engineer responsible for the internal review of the overall layout and final design of the 750 MW solar project. Responsible for the detailed review of all hydrology and hydraulic studies and designs used for the development of the project.

Senior Project Engineer, Salitrillos Solar, Mexico. Senior Project Engineer responsible for the internal review of the overall layout and final design of the 500 MW solar project. Responsible for the detailed review of all hydrology and hydraulic studies and designs used for the development of the project.

Senior Project Engineer, Don Jose Solar, Mexico. Senior Project Engineer responsible for the internal review of the overall layout and final design of the 450 MW solar project. Responsible for the detailed review of all hydrology and hydraulic studies and designs used for the development of the project.

Senior Project Engineer, Red Dirt Wind, Oklahoma, USA. Senior Project Engineer responsible for the internal review of the overall layout and final design of the 300 MW wind project. Responsible for the detailed review of all hydrology and hydraulic studies and designs used for the development of the project.

Senior Project Engineer, Thunder Ranch Wind, Oklahoma, USA. Senior Project Engineer responsible for the internal review of the overall layout and final design of the 297 MW wind project. Responsible for the detailed review of all hydrology and hydraulic studies and designs used for the development of the project.

Senior Project Engineer, Fenner Repowering Wind, New York, USA. Senior Project Engineer responsible for the internal review of the overall layout and final design of the 30 MW wind repowering project. Responsible for the detailed review of all hydrology and hydraulic studies and designs used for the development of the project.

Senior Project Engineer, Aurora Solar, Minnesota, New York, USA. Senior Project Engineer responsible for the internal review of drainage issues associated with the construction of the projects. Project manager and technical practice lead engineer responsible for the delivery and successful execution of projects ranging in size from $50,000 to $10M with varying project durations. Work included orchestrating design efforts from multiple offices in various countries and time zones to meet client expectations and project objectives. Direct reporting to the Vice President of Energy and Industry California and Vice President of Canadian Operations.

Career History

2018 – Present	Hatch Ltd.
2014 - 2018	ENEL Green Power, Andover, MA, Principal Hydro Engineer Responsible for North America and Central America
2012 - 2014	MWH Global, Sacramento, CA, Project Manager and Lead Supervising Engineer
2009 - 2012	Kleinschmidt Associates, Pittsfield, ME, Project Manager and Project Engineer
2007 - 2009	Gannett Fleming Inc., Phoenix, AZ, Assistant Project Manager
1999 – 2001, 2003 - 2007	Sowby and Berg Consultants, American Fork, UT, Staff Engineer/Engineering Technician

Publications

Enel Green Power's Apiacás Hydroelectric Project, ICOLD 2016, HydroVison International 2016.
Increasing Generation Capacity at Ponte Serra Dam; Italy's Oldest Operating Dam, ICOLD Norway 2015
Operational Unknown: St. George Power's Previously Unknown Geologic Constriction Now An Operational Management Plan Asset, HydroVision International 2014

Languages

English (expert), Spanish (verbal and written), Italian (very basic, learning)

William (Bill) Crowley, P.E.

SR Mechanical Engineer, US Lead, Turbines and Generators

Education

Certificate in the Fundamentals of Project Management, Penn State University, York, PA, June 2004

BSMET, Mechanical Engineering, University of Pittsburgh, Pittsburgh/Johnstown, PA, April 1987

Professional Affiliations

Registered Professional Engineer: Pennsylvania - Member

Summary of Experience

Bill is a global hydropower industry organization leader with 35+ years of experience in the design, manufacturing, installation, and assessment of hydroelectric power equipment. He has extensive knowledge of all types of Turbines (Kaplan, Francis, Mixed Flow, Pump Turbines, Pelton, Pit, Bulb, and Saxo style ranging from 1 MW to 500+ MW in output); shutoff valves (butterfly and spherical), and general knowledge of generators (synchronous, variable speed, motor/generators) automation, controls, balance of plant, and excitation equipment.

Relevant Experience

Hydro Power Equipment Experience

In the role of Sales Manager and with the support of direct reports (Offer Project Managers, Estimators, and Engineers) as well as other global company Subject Matter Experts (SME), he was responsible for securing new capital project contracts for Voith Hydro with an emphasis on the modernization hydro market as well as support for new hydro development. The value of these modernization contracts ranged from 1 MUSD up to 100 MUSD, and new hydro development projects reached up to 500 MUSD for the equipment supply and installation. These projects included small hydro units as well as more complex large, pumped storage hydro plants. Other responsibilities included the development of new customers, the retention of current customers, and the further development of team members. He also worked closely with company's risk management team to develop Master Services Agreements with new customers.

Worked closely with sales team members and other subject matter experts (SME) within other company organizations (domestic and international) to develop and deliver winning proposals to clients for both competitive and negotiated business opportunities.

Performed onsite hydro plant equipment assessments with both domestic and foreign customers with a focus on turbine and generator equipment. Utilized the information gathered from these assessments to prepare value added business propositions for these customers.

As an Offer Project Manager, he was responsible for the technical support, planning, and overall integration of company resources for the creation of new competitive proposals within the Sales / Marketing Department.

As an Engineering Manager, he was responsible for managing the proposal engineering department team to provide competitive technical solutions / support for the development of new proposals for the Sales and Marketing Department. Led, mentored, and coached the department team members comprised of various engineering disciplines including turbine, generator, automation, and controls.

As a project Manager, he was responsible to successfully execute assigned projects on-time and on budget in accordance with company and project specification quality standards. Developed opportunities on existing project contracts to find value added contract change orders. Successfully executed both turbine and generator modernization projects at the Narrows, Cheoah, and Chillhowee plants owned by Alcoa at the time.

As an Engineering Manager, he planned, designed, and managed various kinds of engineering projects as well as trained / coached four (4) junior engineers in turbine equipment design methods and standards.

As a Lead Engineer, he was responsible for the coordination of mechanical product design engineering and project leadership for fixed blade runner type modernization projects as well as the Lead Power Unit (Turbine and Generator) Engineer for the new vertical Kaplan units at the Mercier project with Hydro Quebec.

As an Engineering Team Leader and with support from other senior engineering management, he was responsible to lead, mentor, coach, and develop a team of design and manufacturing engineers (4 direct reports) responsible for the mechanical design and manufacturing engineering of assigned projects. Among these projects were turbine components manufactured at both the Voith York and Voith Shanghai facility for the Guangzhou II (Pump Turbine), Xiaolangdi (Large Francis) and Yang Zhou Yong (Spherical Valves for Pumps / Turbines) projects, all located in China.

As a Turbine Mechanical Engineer and under the mentoring of senior engineers, applied best techniques, procedures, company / industry standards for the design of mechanical turbine equipment and components for low head horizontal shaft turbines of the “Pit” and “S” type. Provided detail design engineering for a bearing stiffening project for the Raccoon Mountain Pumped Storage units.

Career History

2021 – Present	Hatch Associates Consultants, Inc., Amherst, New York, United States, US Lead, Turbines and Generators
2018 – 2021	Voith Hydro, York, Pennsylvania, United States, Sr. Sales Manager (4 direct reports)

2013 – 2017	Voith Hydro, York, Pennsylvania, United States, Offer Project Manager/Sr. Proposal Engineer
2009 – 2012	Voith Hydro, York, Pennsylvania, United States, Manager of Proposal Engineering Department (6 direct reports)
2005 – 2008	Voith Hydro, York, Pennsylvania, United States, Project Manager
1997 – 2004	Voith Hydro, York, Pennsylvania, United States, Mechanical Design Team Leader/Project Leader (4 direct reports)
1995 – 1996	Voith Hydro, York, Pennsylvania, United States, Project Manager / Project Engineer
1990 – 1994	Voith Hydro, York, Pennsylvania, United States, Engineering Team Leader (4 direct reports)
1987 – 1989	Voith Hydro, York, Pennsylvania, United States, Mechanical Engineer

Technical Papers

Authored or coauthored four (4) technical papers in support of the Sales and Marketing department. These papers include topics for both new and rehabilitated turbine equipment.

Professional Development

Actively participated in various industry related conferences as both a general participant and as a presenter of technical papers.

Languages

English (expert)

Andrew Breighner

Hydropower Specialist

Summary of Experience

Professional engineer with over a decade of experience in the hydropower industry. Background in mechanical engineering with design experience for Francis runners, pump / pump-turbine impellers, and hydropower unit rehabilitation / modernization. Experience with component design, project engineering. and proposal engineering efforts for hydroelectric turbine and generator projects. Expertise in mechanical design of fixed blade runners and discharge ring replacements.

Key projects and roles include:

- Lead Turbine Engineer for the Upper Malad Hydroelectric Plant rehabilitation project in 2014.
- Lead Turbine Engineer for the Markland Hydroelectric Station rehabilitation from 2015 to 2019.
- Chief Project Engineer for Cherokee Dam modernization project from 2018 to 2019.

Relevant Experience

Snowy Hydro, Snowy 2.0, Australia, Design Engineer. Structural analysis and mechanical design of the bottom ring, draft tube, and embedded components.

International Assignment, Heidenheim an der Brenz, Germany, Design Engineer. Design engineering in the global technology center for Voith Hydro for the runner office. Design efforts focused on the mechanical design of fixed blade runners and impellers.

Fixed blade runner designs include the following projects: Xia Men, Hensfoss, Liao Ning Qing Yuan PSP, LaZiWa, Mareges, Naitwar Mori HEP, Ritom PSP, and Wan Jia Zhai PSP.

Tennessee Valley Authority , Cherokee Dam Modernization , Jefferson County, United States, Cheif Project Engineer. Chief Project Engineer responsible for engineer schedule and submittals. Performed mechanical design for a new aerating Francis runner and air admission system. Project scope also included new distributor components and general turbine rehabilitation.

Duke Energy, Markland Hydroelectric Station Rehabilitation , Florence, IN, United States, Lead Turbine Engineer. Lead engineer for the rehabilitation and modernization of the Markland turbine. Scope of work included the design and supply of

a new Kaplan runner, new discharge ring, new bottom ring, new wicket gates, new air admission, distributor rehabilitation, shaft / shaft seal rehabilitation, oil head rehabilitation, and turbine guide bearing rehabilitation.

Idaho Power, Upper Malad Hydroelectric Plant Rehabilitation , Hagerman Idaho, United States, Lead Turbine Engineer. Lead engineer for the rehabilitation and modernization of the Upper Malad turbine. Scope of work included the design and supply of a new Francis runner, distributor rehabilitation, shaft / shaft seal rehabilitation, and turbine guide bearing rehabilitation.

Santee Cooper, Jefferies Hydroelectric Station Modernization, South Carolina, United States, Project Coordinator and Engineer. Duel role as project and coordinator and mechanical engineer. Supported site schedule and field service activities. Design engineer for new wicket gates, new bottom ring, and new discharge ring.

AMP, Ohio River Project, Ohio River, United States, Project Cooridnator. Coordinated customer submittals, supply chain activities, and field service activities for four (4) new power plants along the Ohio River. Power houses included were Smithland, Willow Island, Meldahl, and Cannelton.

Career History

2022 - 2023	Voith Hydro Inc., York, PA, United States. Supervisor, Proposal and Service Engineering
2020 - 2022	Voith Hydro Inc., York, PA, United States. Proposal Engineer
2019 - 2020	Voith Hydro Inc., Heidenheim an der Brenz, Germany. Design Engineer
2014 - 2019	Voith Hydro Inc., York, PA, United States. Mechanical Engineer
2013 - 2014	Voith Hydro Inc., York, PA, United States. Project Coordinator

Languages

English, German

Allison Lunde

Senior Structural Engineer

Education

MSc, Civil Engineering, Iowa State University, Ames, Iowa, United States, 2011

MBA, Business Administration, Iowa State University, Ames, Iowa, United States, 2010

BSc, Civil Engineering, Iowa State University, Ames, Iowa, United States, 2010

Summary of Experience

Allison Lunde has over twelve years of civil and structural engineering experience specializing in the design, analysis, and inspection of reinforced concrete, reinforced masonry, structural steel, and timber structural systems. She has designed bulkhead and dewatering systems, new head gates, concrete repairs, and structural steel upgrades to steel vertical and radial gates for numerous dams regulated by the Federal Energy Regulatory Commission (FERC).

Relevant Experience

Eagle Creek Renewable Energy, Morrow Hydroelectric Facility - Gate Replacement Project, Michigan, United States, Project Manager and Structural Engineer. Project Manager and Structural Engineer for new design of radial gate with flap gate on top, design of structural steel dewatering system for spillway, existing radial and flap gate hoist and chain analysis, civil site layout and access, global and local stability for dewatered conditions, crane pad design and analysis. Responsibilities also included preparation of design drawings, technical specifications, design report and additional documentation such as Quality Control Inspection Program (QCIP) and Temporary Construction Emergency Action Plan (TCEAP) for the FERC approval.

Consumers Energy, Mio Hydroelectric Project - Left Retaining Wall Replacement, Mio, Michigan, United States, Project Manager and Structural Engineer. Project Manager and Structural Engineer responsible for option study for tailrace retaining wall repairs and replacement, design of new concrete retaining wall system and associated dewatering cofferdam, seepage analysis and potential localize boils due to dewatering, design report, design drawings, review and construction implications of Potential Failure Modes (PFMs) and supporting documentation for FERC approval.

City of St. Cloud, St. Cloud Hydroelectric Facility, St. Cloud, Minnesota, United States, Project Manager/Structural Engineer. Allison served as the main client contact, project manager and structural engineer for the City of St. Cloud for numerous projects at the St. Cloud Hydroelectric Facility which is a 8.86 MW hydroelectric generating facility located in central Minnesota that is regulated by the Federal Energy Regulatory Commission (FERC). Structural Engineer that provided design and construction oversight of permanent bulkhead system for dewatering of radial gates. Structural Engineer that performed structural analysis of a damaged waler beam for a transition wall between radial gates and overflow spillway. Project Engineer that completed Emergency Action Plan (EAP) updates. Project Manager that oversaw dam break analysis to determine inflow design flood (IDF) for facility. Project Manager and Structural Engineer - DAM BREAK ANALYSIS Structural Engineer that provided detailing (steel repair, new rubber seals and coating system) and construction drawings and specifications to complete rehabilitation of existing structural steel bulkheads for each turbine generating unit. Project Manager that oversaw technical review of a turbine rebuild effort. Project Manager and Structural Engineer that complete sensitivity analysis of the overflow spillway concrete gravity dam to determine if replacement of manometers with erratic readings was necessary for dam safety considerations. Project Manager - PART 12D & STID Updates & DSSMP Updates & Security Plan Structural Engineer provided emergency powerhouse tailrace scour repairs based on dive inspection findings from Part 12D inspection. Project Manager that provided oversight to site SCADA upgrades include turbine and generating equipment. Project Manager and Structural Engineer that provided details on localized concrete repairs to overflow spillway concrete tailrace walls and baffle blocks due to dive inspection findings from Part 12D inspection. Project Manager and Project Engineer that provided oversight and development of FERC documents for licensing effort. Work included development of the following documents: Notice of Intent, Fact Sheet, Pre-Application Document, and Proposed Study Plan. Provide support and coordination services for the City with the Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, and FERC agencies.

Minnesota Power, Hydroelectric Facilities, Minnesota, United States, Structural Engineer. Provided structural engineering and project management services as follows: Thomson Hydroelectric Facility: Design of new structural steel heads gates, dewatering system, trashrack replacement, and performance specified stainless steel head gates for full site rehabilitation due to flood damage. Provided onsite construction support and construction management services such as submittal review and RFI responses. Structural Engineer that designed multiple items at the project site's upper and lower gate houses and powerhouse. Both gatehouses involved the development of a performance specification for stainless-steel head gates, an electric operator to replace existing systems, and sill modifications for the new head gates. Work involved reviewing all submittals from the gate manufacturer prior to FERC submittal and overseeing construction. For the lower gatehouse, designed a bulkhead column to replace the existing corroded column in Unit #5. The powerhouse work included design of height extensions for a lifting system to remove a portion of the penstock flange and design of a new lifting system for a penstock flange. Blanchard Hydroelectric Facility: Structural Engineer that provided construction management and oversight for tainter gate upgrades, which included those to structural steel members to meet current code standards, upgrade of the existing trunnion bearing to a greaseless system, installation of new side and bottom seals, lead abatement of existing coating, coating application, and installation of sacrificial anodes for corrosion protection.

US Army Corps of Engineers, USACE Lock 21 Repairs, Illinois, United States, Project Engineer. Project Engineer responsible for the design of a steel cofferdam for localized dewatering for concrete wall repairs at Lock and Dam21 on the Mississippi River for the US Army Corps of Engineers. Responsibilities also included design report with calculations and design drawings, construction management and assistance to contractor for wall protection design within the cofferdam.

US Army Corps of Engineers, USACE Hydroelectric Projects - Spillway Improvements, South Dakota & Montana, United States, Structural Engineer. Structural Engineer that provided structural steel temporary support structure design, drawings and construction support for radial gates during construction for Big Bend Hydroelectric Facility and Fort Peck Hydroelectric Facility.

Consumers Energy, Hydroelectric Facilities, Michigan, United States, Structural Engineer. Provide numerous structural engineering services as follows: Stability analysis Rogers STID Updates

Consumers Energy, Alcona RIDM Study, Michigan, United States, Structural Engineer. Structural Engineer that was responsible for reviewed of stability analysis calculations completed for Risk Informed Decision Making (RIDM) work at site.

City of Oslo, Oslo Flood Control Project, Oslo, Minnesota, United States, Structural Engineer. Structural Engineer that complete structural stability analysis for numerous flood control structures (gatewells) for numerous load conditions in accordance with USACE design guidance.

Alliant Energy, Tailrace Repairs, Wisconsin, United States, Structural Engineer. Structural Engineer that provided concrete details for tailrace repairs for the Kilbourn and Prairie du Sac Hydroelectric Facilities in Wisconsin. Facilities are regulated by FERC.

Fargo-Moorhead Area Diversion Authority, Oxbow-Hickson-Bakke Ring Levee, Fargo, North Dakota, United States, Structural Engineer. Structural Engineer responsible for detailed design, calculations, design report and design drawings for the pump station of the Oxbow-Hickson-Bakke (OHB) ring levee improvements as part of the Fargo-Moorhead Area Diversion Authority project. Provide construction oversight include submittal review, RFI responses, and design modifications and onsite inspection.

Ames Construction, Olmsted Hydroelectric Facility, Orem, Utah, United States, Structural Engineer. Structural Engineer that provided construction dewatering details for multiple downstream tailraces and provided construction support to contractor during dewatering activities.

CHS, Inc, Oilseed Processing DTDC Retrofit, Minnesota, United States, Project Manager. Project Manager that provided structural engineering services for a failed oilseed processing dryer failure. Services including site inspection to measure and observe failure and locations for retrofit, FEA modeling of dryer structure to design structural steel retrofit, and design drawings and construction oversight for retrofit.

Career History

2011 - 2020 Barr Engineering Co., MINNEAPOLIS, United States. Structural Engineer

Languages

English

Ross Mullen

Water Resources Engineer/Hydrotechnical Engineer

Education

BSc, Civil Engineering, University of North Dakota, Grand Forks, ND, United States, 2011

Summary of Experience

Ross is a Water Resources Engineer (Hydrotechnical Engineer) with over a decade of experience as a consulting engineer. His primary expertise is in hydrologic and hydraulic modeling, which he useds to solve problems around stormwater management, floodplain management, assisting in water quality studies, stream restoration and restoration, and design of hydraulic structures.

Relevant Experience

Impala, LDI Mine, Ontario, Canada, Modeling Lead. Ross developed a FLO-2D tailings dam breach analysis for the LDI Mine in Ontario to assess risk to site staff and environmental receptors

Diversion Authority, Fargo Diversion Public-Private Partnership, Fargo, North Dakota, United States, Modeling and Hydraulic Designer. Ross served to integrate all proposed design elements into the Red River Valley Partner's HEC-RAS model and was the design lead for the two aqueducts. Throughout the duration of the project, Ross has complete hydraulic analysis, modeling, and design for the proposed 31-mile diversion-- the largest of Public-Private Partnership in the US. He has completed third-party reviews of the authority's hydraulic model that simulates hundreds of miles of river channels, has designed spillways for smaller tributaries that discharge into the diversion, designed engineered conveyance channels, assessed the hydraulic capacity of the proposed aqueducts over the diversion using 2D models and reviewing CFD(3D) as well as physical model results, completed mathematical proofs and written code for hydraulic analysis, and assessed these structures for fish passage. Ross served in a QAQC capacity for the inlet designs, local drainage, and main channel diversion design.

Capital Region al District - Regional Water Supply Commission, Buck Lake Dam, North Pender Island, British Columbia, Canada, Technical Advisor and QAQC. Ross advised a project team constructing a 2D HEC-RAS model of the dam breach inundation zone on North Pender Island, located in the Swanson Channel, near the British Columbia- Washington State border. The model was used as the basis for an updated dam consequence (hazard) classification.

Water Security Agency, Wascana Dam, Regina, Saskatchewan, Canada, Modeler. Ross improved the numerical stability and accuracy of a model developed by another consultant to complete a dam breach model and analysis of the Wascana Dam,

located near downtown Regina. The model was built in 2D HEC-RAS and used to assess both the risk of the failure of the concrete dam as well as an earthen embankment for various design frequency flood events, in accordance with the Canadian Dam Association breach analysis guidelines.

CVEA, Solomon Dam, Valdez, Alaska, United States, Modeler. Ross completed a dam breach model of the Solomon Dam and Solomon Creek, a water course with an average slope of 17% near Valdez, Alaska. The model was built in 2D HEC-RAS, using dam breach guidance from the FERC, to provide a better understanding of the arrival time of a dam breach flood wave to the Population At Risk (PAR) downstream of the dam.

Various, Twin Cities HUC-8 Updates, Twin Cities, MN, United States, Modeler, Technical Lead, QAQC. Using a grant from the Federal Emergency Management Agency (FEMA), the Minnesota Department of Natural Resources (MNDNR) leveraged existing local watershed models, where available, to complete floodplain modeling for nine watersheds in the Twin Cities HUC-8 area for incorporation in a future FEMA Flood Insurance Study (FIS) and Flood Insurance Rate Maps (FIRMs). Ross served as the project lead for two of these studies and was technical advisor for two others to meet FEMA's modeling and reporting standards.

- Bassett Creek Watershed Management Commission: Project Lead for watershed-wide, calibrated XPSWMM model.
- Coon Creek Watershed District: Project Advisor for watershed-wide, calibrated XPSWMM model.
- Shingle Creek Watershed Management Commission: Project lead for watershed-wide, calibrated PCSWMM model.
- Ramsey-Washington Metro Watershed District: Project advisory.

Maple Lake Improvement District, Maple Lake Outlet Structure, Maple Lake, MN, United States, Project Lead. Ross developed a PCSWMM model of the Maple Lake outlet structure and used the model to design an outlet structure of the lake to regulate the normal water level and manage flood flows in accordance with floodplain regulations.

ECWMC, Elm Creek Watershed Management Consultant Engineer, Twin Cities, MN, United States, Consultant Engineer. Ross served as the Elm Creek Watershed Management Commission consultant engineer. In this capacity, he completed project reviews (permits) for the watershed and reviewed proposed construction for erosion and sediment control measures, rate control, water quality, and volume management. Ross also facilitated meetings, helped member cities meet MS4 reporting standards, and recommended projects for CIP funding.

Various, Solar Array Project Work, Wisconsin, United States, Modeling Technical Lead. Ross served as technical lead to develop scour estimates and determine floodplain estimates for four unique solar array project sites in Wisconsin. Ross developed 2D HEC-RAS models of each site and integrated HEC-18 scour equations into the 2D RASMapper output to calculate scour.

City of Madison, Starkweather Creek and Olbrich Gardens, Madison, WI, United States, Modeling Technical Lead. Ross served as modeling technical lead for a 2D XPSWMM model of the Starkweather Creek and Olbrich Gardens (roughly the northern half of the city of Madison) of approximately 16,000 acres of mostly urban drainage.

City of Crystal, Gaulke Pond, Crystal, MN, United States, Project Manager then Regulator. Ross worked with the city of Crystal to develop feasibility alternatives to address pluvial street flooding and flooding of land-locked ponds that were threatening nearby homes and a school. The project constructed a stormwater lift station (pump station) and forcemain improvements to mitigate future flooding. Ross later worked on behalf of watershed (the governmental unit) to analyze the inter-city impacts associated with the pump station.

City of St. Paul (Minnesota), Crosby Subwatershed Assessment, St. Paul, MN, United States, Project Manager. Ross managed a project to construct stormwater hydrology and hydraulic models (in XPSWMM) and corresponding water quality models (P8). He used these analyses to recommend conveyance improvements and water quality projects in advance of a future street reconstruction project and to help the city meet its state and federal MS4 and TMDL requirements.

Bois Forte Band of Chippewa, Bois Forte Nett Lake Dam Removal, Nett Lake, MN, United States, Water Resources Technical Lead. Ross prepared three conceptual level analyses for removal of the Nett Lake dam, owned by the Bois Forte Band of Chippewa. These conceptual level analyses focused on fish passage and lake level management of Nett Lake, for the production of wild rice. The selected option combined rock arch rapids with a stop log structure system.

Prior Lake- Spring Lake Watershed District, Upper Watershed Blueprint, Twin Cities, Minnesota, United States, Modeling Lead. Ross recalibrated an existing, detailed 1D PCSWMM model for events other than the flood of record so that the model could serve as the basis for stormwater management and inform water quality monitoring and analysis within the watershed. He processed NEXRAD data, and rectified with ground-based rainfall gages, to create a spatially varied precipitation. Ross then simulated dozens of development scenarios for the rapidly growing southern Twin Cities metro and the correlated impacts to flooding within the basin. He then reviewed and proposed flood mitigation projects as well as ordinances that could be developed to lower flood risk in these communities.

SaskPower, USACE, and WSA, Hydrotechnical Services for Confidential Coal Fired Power Plant and its Dam/Reservoir used for Cooling Water, Saskatchewan, Canada, Hydrotechnical Engineer. Ross completed a non-Newtonian fluid flow hypothetical embankment failure analysis for seven coal combustion residuals storage facilities located on the site following the latest draft Canadian Dams Association technical bulletin on tailings basin failure analysis. Ross also created and calibrated a 1D HEC-RAS model of over 200-miles of the downstream river system in conjunction with USA and Canadian regulators as part an international flowage agreement for the river system. He then used the model to calculate wind-induced runup and freeboard at the dam, assess the spillway capacity, review the dam for cavitation potential, complete a coincident frequency analysis for adjacent reservoirs, and calculated the inflow design flood for the dam.

Souris River Joint Board/ City of Minot, Mouse River Flood Mitigation, Minot, ND, United States, Modeler and Designer. Following the 2011 Mouse River flood (also called the Souris River), Ross was part of a team that completed preliminary design for flood-risk reduction system improvements in the river valley between Burlington and Velva North Dakota (including Minot).

The preliminary design included construction of a series of levees, floodwalls, and two high-flow bypass channels designed. Ross built and calibrated a 1D HEC-RAS model of almost 400 river-miles of the Mouse River and its tributaries and was part of a team of modelers that built and calibrated an additional 200 river miles. He also developed 2D HEC-RAS models of the Maple River high-flow diversion and the around the city of Burlington. The preliminary design was complicated by international flow agreements, effective and preliminary effective hydrologic flow rates from FEMA, and modification of an existing federal levee system requiring Section 408 approval from the U.S. Army Corps of Engineers. The project used the U.S. Army Corps of Engineers Flood Damage Reduction Analysis software (HEC-FDA) to provide economic analysis and cost/benefit.

Confidential, Confidential Refinery, North Dakota, United States, Technical Lead. Ross built a comprehensive PCSWMM model of the stormwater management system of a refinery in North Dakota, including its unmanaged stormwater system, managed stormwater (non-contact), and combined (contact) process water and stormwater systems. The model and his work served to guide development of future units at the refinery, serve as its asset management system, proposed

stormwater management features to mitigate onsite flooding, and guide the design of a new oily-water separator and equalization tank. The total estimated cost to construct these features is expected to be $75M.

Confidential, Petroleum Pipeline Design and Maintenance, Midwest, United States, Modeler and Hydraulics Lead. Ross has completed dozens of hydrologic and hydraulic analyses of natural gas and petroleum pipeline crossings of watercourses using XPSWMM, PCSWMM, HEC-RAS, FHWA Hydraulic Toolbox, HydroCAD, and HEC-HMS. These analyses are used to design scour protection around pipelines, obtain water appropriation permits used for pipeline pressure testing, designing cofferdams for construction, and discharge permits to ensure that rapid discharge from pressure testing does not impact aquatic species. He has completed these analyses in Illinois, Kansas, Minnesota, Missouri, Nebraska, North Dakota, Wisconsin, and Wyoming.

Coon Creek Watershed District, Coon Creek Precipitation Analysis, Twin Cities, MN, United States, Modeler. The Anoka Conservation District (ACD) had a network of rainfall monitoring gages that it operated on behalf of the Coon Creek Watershed District. In 2018, the ACD discontinued the collection of rainfall data. Ross used PCSWMM to process NEXRAD data to help the Coon Creek Watershed District understand if the reduced number of rainfall monitoring gages (now only the publicly available gages) would reduce the accuracy of future district-wide XPSWMM model calibration efforts.

BCWMC and City of Minnetonka, Stormwater Plan Reviews for Bassett Creek Watershed Management Commission and the City of Minnetonka, Twin Cities, MN, United States, Project (Permit) Reviewer. Ross served as one of several reviewers that provide technical review of stormwater plans of proposed construction activity submitted to the City of Minnetonka or the Bassett Creek WMC. These plans were assessed for erosion and sediment control, runoff rate control, water quality effluent, floodplain management, culvert/bridge sizing, buffer strips, and volume management.

City of Lakeville, City of Lakeville East Lake Fish Barrier, Lakeville, MN, United States, Modeler and Designer. Ross developed five conceptual-level design alternatives for the city of Lakeville to consider for the outlet of East Lake to reduce/limit the upstream migration of common carp into the lake, which is a spawning area. The watershed and flood levels of East Lake were modeled in XPSWMM. The city has temporarily constructed a chain-link fence to limit carp while pursuing a low-voltage fish barrier.

City of Rochester, Floodplain Management for the City of Rochester, Rochester, MN, United States, Modeler and Ordinance Writer. Ross updated or created seven of the city of Rochester's floodplain models with the latest hydrologic elevation datasets (Atlas 14) to better understand flood risk in the rapidly developing community. Ross also developed a 2D HEC-RAS model for the Cascade Creek watershed. He used the model results to propose floodplain management strategies for the city, including upstream storage, buyouts, and floodplain ordinances to reduce risk. He drafted floodplain model ordinance and prepared maps for zoning to better manage flood risk. Ross also assisted in the recertification of the Bear Creek levees.

Various, Dam Breach Analyses of Tailings Basins at 5 Confidential Unique Mining Facilities in Northern Minnesota, Northern Minnesota, United States, Modeler, Technical Lead, QAQC. Ross has completed dozens of embankment failures analyses at five confidential, unique tailings facilities in Northern Minnesota using FLO-2D and HEC-RAS to assess the risk of non-Newtonian, hyper-concentrated, mud-floods, and mud-floods for hypothetical embankment failures in accordance with the draft Canadian Dams Association breach analyses, which he helped develop.

Confidential, Confidential Coal Mine Dam Breach in North Dakota, North Dakota, United States, Water Resources Lead. Ross completed a pond design, erosion and sedimentation estimate analysis, freeboard analysis, hydrologic model (HEC-HMS), and dam breach model (1D HEC-RAS) for a proposed coal mine in North Dakota.

Washington County, Farney Dam- Washington County Minnesota Dam Repair, Washington County, United States, Water Resources Project Designer. Ross designed a new primary drop-inlet spillway and energy dissipating plunge pool for a failing dam. He used a PCSWMM model to understand the hydrology of the Farney Dam and complete the hydraulic analysis.

City of Crystal, Becker Park Infiltration System, Crystal, MN, United States, Modeling Lead. Ross served as the modeling lead for a 2D PCSWMM model to show the flood mitigation benefit of a two underground infiltration systems built in Crystal, Minnesota primarily to address MS4/TMDL water quality requirements.

Nutrient, Patience Lake Stormwater Improvemetns, Patience Lake, SK, Canada, Modeler and Designer. Ross built a PCSWMM model of the Patience Lake watershed and used the model as the basis for site design to divert contaminated stormwater runoff to a proposed pond, pump station, and injection well to keep contaminated runoff from the Patience Lake Nutrient site from entering Patience Lake.

Confidential, Fort McMurray Third-Party Dam Safety Review, Fort McMurray, Alberta, Canada, Third-Party Reviewer. Ross completed a third-party dam safety review of a tailings embankment for a site near Fort Mc Murray, Alberta.

R.M. Corman Park, R. M. Corman Park Floodplain Modeling, Saskatchewan, Canada, Technical Advisor and QAQC. Ross advised a project team constructing a 2D HEC-RAS model of the floodplain in and around the Rural Municipality of Corman Park, Saskatchewan. the model results were used to guide future development within the floodplain and recommend floodplain ordinances to protect public and private infrastructure.

Afton Chemical, Afton Chemical, East St. Louis, IL, United States, Modeler, QAQC, and Design Lead. Ross assisted a chemical plant in Illinois to meet regulatory discharge requirements on rate/volume to a jointly operated combined sanitary-storm wastewater treatment facility. Ross served as QAQC of the XPSWMM model of the facility, and the entire watershed contributing to the jointly operated combined sanitary-storm wastewater treatment facility. Ross developed a 2D Adaptive Hydraulics (AdH) model to size a weir within an existing outfall structure to better measure the combined storm and process water load to the wastewater facility.

Coachella Wind Farm, Coachella Wind Farm, Palm Springs, CA, United States, Technical Advisor and QAQC. Ross guided the development of a 2D HEC-RAS model of a proposed windfarm on a mountainous outwash. The model results were used to design scour protection around the footings of each wind turbine.

Souris River Joint Board, Outlaw Creek, Towner, ND, United States, Modeler. Outlaw Creek is an overland drainage path that functions as a high-flow channel of the Mouse River. The Mouse River floodplain is flat, dominated by agricultural land use, and nearly two miles wide near Outlaw Creek. Ross developed and calibrated a 2D HEC-0RAS model of the creek. He then used the model to propose several flood mitigation strategies to reduce flood magnitudes (both depth and duration), including rural levees, additional channel conveyance capacity, additional interior drainage capacity, and develop recommendations to nearby dam operations. The study resulted in recommendations and planning-level cost estimates for steps the Board could take to reduce flood risk for the area.

City of Des Moines, Des Moines Levee Improvements, Des Moines, Iowa, United States, Hydraulic Engineer. Ross served as a floodplain advisor to a team working to increase flood protection for the City of Des Moines. Ross ensured sufficient freeboard was provided for these systems based on FEMA design criteria.

Lantic Beat Sugar, Lantic Beat Sugar Stormwater Retrofit, Taber, Alberta, Canada, Modeler and Designer. Ross built a PCSWMM model of the Lantic Beat Sugar facility in Taber, Alberta. He used the model to design a retrofit stormwater pump

system to redirect stormwater runoff from the facility to its wastewater treatment facility to meet new regulatory requirements.

City of Minneapolis, Hall's Island, Minneapolis, MN, United States, Hydraulic Modeler. Ross co-developed a HEC-RAS hydraulic model of the Mississippi River within the city of Minneapolis. The city of Minneapolis reconstructed a historic island (Hall's Island) in the river that had incorporated into the eastern shoreline after more than a century of dumping into the eastern channel of the river. He used this model to deter to complete hydraulic modeling and assist with no-rise certification of the project.

BCWMC, Bassett Creek Phase 2 XPSWMM Model, Twin Cities, MN, United States, Modeling Lead. Ross served as the modeling lead for a comprehensive hydrologic and hydraulic XPSWMM model of the Bassett Creek watershed. The model included approximately 1,200 watersheds and simulated approximately 40 square miles of urban drainage. The model was calibrated at five locations.

City of Bloomington, City of Bloomington XPSWMM Model, Bloomington, MN, United States, Modeler. Ross built the XPSWMM model for approximately one-third of the city of Bloomington, Minnesota. The model used Atlas 14 rainfall data to help the city identify flood-prone structures and storm sewer systems that did not provide the city's expected level of service and level of protection.

City of Prior Lake, Prior Lake Letter of Map Revision (LOMR) and Floodplain Analysis, Prior Lake, MN, United States, Modeler and Applicant's Agent. Ross updated an existing PCSWMM model to meet FEMA's Data Capture Technical Guidance and submitted the model to FEMA as part of a Letter of Map Revision (LOMR) based on better information to revise the base flood elevation of Upper and Lower Prior Lakes and adjacent waterbodies within the city of Prior Lake. As part of the analysis, Ross also helped the community with outreach to residents and to help the city understand how proposed ordinances regulating floodplain fill would impact the base flood elevation of Prior Lake.

Nine Mile Creek Watershed District, Nine Mile Creek Highway 62 Corridor Stabilization, Edina, MN, United States, Modeler and Designer. Ross modeled and designed portions of a five mile-long section of Nine Mile Creek to stabilize the creek, restore the incised channel's access to the floodplain, and submit floodplain permits/ no-rise analyses.

Brainerd Public Utilities, Brainerd Dam, Brainerd, Minnesota, United States, Hydraulic Analysis and Modeler. Ross calculated the hydraulic capacity of a concrete dam on the Mississippi River and subsequently completed a dam breach analysis for the facility. Due to the complex hydraulics at the site, the project partnered with a research university to complete a physical model study of the structure to understand the hydraulic capacity of the structure and proposed revetment options for scour issues at the site. He also rewrote the Emergency Action Plan based on the updated model results and inundation mapping.

City of Lakeville, Lakeville Letter of Map Revisions (LOMRs), Lakeville, MN, United States, Modeler and Applicant's Agent. Ross completed two Letter of Map Revisions (LOMRs) within the city of Lakeville for the Lake Marion outlet and the Donnelly Farm addition. FEMA has approved both LOMRs for the community in Dakota County.

City of Bloomington, City of Bloomington Surface Water Management Plan, Bloomington, MN, United States, Co-author of Plan. Ross served as one of the primary writers of the 2018 Bloomington Comprehensive Plan, Surface Water Management Plan chapter. Ross met with city to assess priorities, policy direction, propose ordinances, and calculate planning-level capital improvement costs.

City of South St. Paul, South St. Paul Levee, South St. Paul, MN, United States, Modeler. Ross built a HEC-RAS model of the Mississippi River adjacent to the city of South St. Paul as part of FEMA accreditation of an existing levee system that was modified to include a new gatewell and closure structure.

City of St. Cloud, St. Cloud Dam Alternatives Assessment, St. Cloud, United States, Hydraulic Designer. Ross served as the hydraulic design engineer for the reconfiguration of the St. Cloud dam spillway and assessed options such as a labyrinth weir and Obermeyer gates to reconfigure the spillway.

Shell Rock River Watershed District, Embankment Failure Analysis Cells used to Store Albert Lea Lake Dredge Materials, Albert Lea, MN, United States, Modeler. Ross updated an existing XPSWMM model to capture the Probable Maximum Precipitation and created a 1D HEC-RAS model to simulate an embankment failure of cells constructed to hold the dredged sediment from Albert Lea Lake. The analysis was used to understand the proposed project location and the associated risk of a hypothetical failure to Interstate 90.

VRWJPO, Vermillion River Watershed Joint Powers Organization Modeling and Planning for the Cities of Lakeville and Farmington, Lakeville and Farmington, MN, United States, Modeler. Ross modeled the communities of Lakeville and Farmington in XPSWMM, which have been experiencing rapid development and urbanization, to maximize the development potential by identifying and planning for regional stormwater treatment facilities.

City of St. Cloud, St. Cloud Dam Breach Analysis, St. Cloud, Minnesota, United States, Lead Modeler. Ross served as the lead modeler for a dam breach analysis of the St. Cloud dam, located on the Mississippi River.

Nutrient, Nutrien Lanigan, Saskatchewan, Canada, Modeler and Designer. Ross developed a HydroCAD model of the Nutrien Lanigan site for use in designing onsite stormwater retention features.

South Fork Crow River Dam Removal, Hutchinson, MN, United States, Modeler. Ross used Adaptive Hydraulics model (AdH) a 2D model published by the U.S. Army Corps of Engineers to simulate the rock arch dam used to replace an existing low-head dam in Hutchinson, Minnesota on the South Fork Crow River. The model was used to assess and optimize the placement of boulders for fish passage.

Nine Mile Creek Watershed District, Nine Mile Creek XPSWMM Model Updates, Modeler. Ross updated approximately half of the district-wide Nine Mile Creek XPSWMM model with overland flow paths and street conveyance to better understand Atlas 14 rainfall data.

Confidential, Confidential Dam Breach Analysis, Northern Minnesota, United States, Modeler. Ross developed a 2D XPSWMM model to simulate a hypothetical embankment failure of a tailings management facility in northern Minnesota. The model results were used to update an Emergency Action Plan.

City of Granite Falls, Granite Falls Dam Breach Analysis and EAP Updates, Granite Falls, MN, United States, Modeler. Ross created a 1D HEC-RAS model to simulate a hypothetical failure of the Granite Falls dam. The analysis was used to understand the Inflow Design Flood (IDF) and to update the Emergency Action Plan (EAP). Ross also calculated the maximum spillway capacity.

City of Minnetonka, Minnetonka XPSWMM Model, Minnetonka, MN, United States, Modeler. Ross built the XPSWMM model of the Minnehaha Creek watershed within the city of Minnetonka south of Minnehaha Creek. This model was used to plan land use and understand flood risk increased associated with Atlas 14 rainfall information.

Confidential, Confidential Refinery, North Dakota, United States, Modeler and Designer. Ross served as the stormwater modeler and one of two designers of the first petroleum refineries built in the United States since the 1970's following CFR guidance for oily-water systems. The refinery was modeled in XPSWMM

Confidential, Confidential Dam Breach Analysis and Emergency Action Plan Updates, Minnesota, United States, Modeler and Writer. Ross served as the modeling lead and writer for the dam breach analysis and emergency action plan (EAP) updates for a dam on the Cannon River. The analysis and EAP addressed flood risk of the Cannon River and emergency response times following guidance published by the MNDNR, FEMA, and the FERC. Ross also calculated the maximum spillway capacity of the dam.

BNSF, BNSF Railroad, North Dakota, United States, Modeler. Ross created two HEC-RAS models to simulate railroad crossings over small creeks. These models were used to size replacement culverts according to BNSF design criteria

Career History

2020 - 2022 Stantec Consultants, Golden Valley, MN, United States. Water Resources Engineer

2011 - 2020 Barr Engineering Co., Bloomington, MN, United States. Water Resources Engineer

Technical Papers

Omid Mohseni,Ross Mullen, Tailings Basin Embankment Failure Modeling, Canadian Dams Association, Canada, 2013

Professional Development

Certified Floodplain Manger, 2013

Professional Engineer: , (AZ, 76490; ME, 17759; MN, 54229; ND, 29649; NH, 17364; NY, 106455; OR, 100850; TN, 1263870; TX, 145908; WA, 2201535)

Languages

English

Muhidin (Dino) Slijepcevic

Principal Electrical Engineer

Education

BSc, Power Generation, University of Sarajevo, Sarajevo / Bosnia and Hercegovina, Yugoslavia, 1979

Professional Affiliations

APEGA - Association of Professional Engineers and Geoscientists of Alberta - Member

EGM - Engineers and Geoscientists Manitoba - Member

PEO - Professional Engineers of Ontario - Member

APEGBC - Association of Professional Engineers and Geoscientists of British Columbia, Canada - Member

Summary of Experience

Dino is a dynamic team-oriented professional with 35 years of expertise in streamlining project processes and operations through design evaluation & innovation, design freeze, manufacturing support, supervision of installation & testing with consistent focus on delivery and quality of product and services for hydro generators. His experience encompasses conceptual, forensic studies and uprate studies following with detail design of the stator / field winding and associate components.

Work closely with senior management to review technical solutions and recommend a way forward which is mutually beneficial to both the organization and the customer

Background in managing and executing multiple complex projects for hydro generation, with the experience of directing all technical aspects of project from offering to customer through to project execution. Dino has been a designer for stator winding / field winding refurbishment for number of Fortis generators at South Slocan and Cora Linn site as well prepare a quote for Waneta, U3 when worked with large OEM. Performing the role of Owner Engineer for FBC / Waneta, U3 trough design, manufacturing QA, installation inspection, witnessing commissioning and acceptance testing.

Successfully executed technical aspects of projects in values ranging from $1M to $50M

Extensive hydro and turbo project / contract management experience

Excellent interpersonal skills and ability to exercise a high degree of diplomacy and discretion

Strong influence and negotiation skills

Relevant Experience

Fortis BC, Waneta - U3, British Columbia, Canada, Principal Engineer. As OE responsible for review / approval and support during design stage, manufacturing and installation of all components for new stator that is rated to 141.5 MVA, 14.4 kV, 0.9 pf.

Energy Ottawa, Hull2 - Generator refurbishment, G1-G4, Ottawa, Canada, Principal Engineer. Responsible for writing a technical specification for Vendors to quote the following: Rewind of the generator G1- G3 rating of 7200 KVA, 2300 V, 0.8 pf and generator G4 rating of 11111 KVA, 6.9 kV, 0.8 pf. Requalifying the existing field winding for generators G1 - G3 and refurbishment of the field winding for generator G4. Refurbishment of the bearings and collector rings for generator G1- G4. Upon receiving the quotation from Vendors, perform technical / commercial analysis that lead to recommendation for best proposal to the Client. As a contract of 10M is signed with two vendors, my role further is to perform required activities of review / approval as owner engineer during the design phase, ITP's, procedures for components refurbishment as well further the installation procedures. The project is in the stage of the new winding installation on generators G1 to G4..

Seattle City Light, HPP Diablo U31 U32, Seattle, WA, United States, Senior Electrical Engineer. Replacement of the stator winding consisting of skewed coils, connections, main and neutral leads collector rings and brush rigging, field winding refurbishment, project engineering for segregated bus and metal clad cubicles. Units are uprated from 66.7 MVA to 100 MVA, 13.8 kV, 171.4 RPM. As a Senior Electrical Engineer responsible for providing uprate study, participation in system engineering, performing component engineering design for replacement of stator core with new clamping system, stator winding with skewed coils, associate components, collector rings, brush rigging, design review of the subcontractors like segregated bus work between generator and GSU, Vibro System and PDA equipment. Provide manufacturing support, review of the factory test reports, subcontractors reports, and construction design submissions, provision of technical support during site installation and equipment testing for the upgrade of the two hydro generators.

BC Hydro, HPP Cheakamus, U1, U2, Squamish, BC, Canada, Senior Electrical Engineer. Replacement of the stator and rotor, main and neutral leads, project engineering for non-segregated bus, BOP electrical on neutral side of the unit, neutral grounding equipment cubicles. Units are uprated from 80 MVA to 100 MVA, 13.8 kV, 400 RPM.

Responsibility include site inspection, condition assessment, responding to customer technical specification for quotation, participation in system engineering, performing component engineering design for new stator core, new stator winding with associate components like parallel rings, coils support, wedging system, main and neutral leads, collector rings, brush rigging, design review of the subcontractors like non-segregated bus work between generator leads and GSU as well as selection of the PDA equipment. Provide manufacturing support, review of the factory test reports, subcontractors reports, and construction design submissions, provision of technical support during site installation and equipment testing for the upgrade of the two hydro generators.

US COE, Fort Peck, G2, Montana, United States, Senior Electrical Engineer. Replacement of the stator core, stator winding, main and neutral leads and PDA equipment. Unit is rated to 19.211 MVA, 13.8 kV, 163.6 RPM.

Responsibility include site inspection, condition assessment, responding to customer technical specification for quotation, participation in system engineering, performing component engineering design for new stator core, new stator winding with associate components like parallel rings, coils support, wedging system, main and neutral leads and PDA equipment.

Provide manufacturing support, review of the factory test reports, subcontractors reports, and construction design submissions, provision of technical support during site installation and equipment testing for one hydro generator.

American Electric Power, Smith Mountain, G2, G4, Virginia, United States, Senior Electrical Engineer. Replacement of the form wound stator winding with associated components, main and neutral leads, field winding refurbishment. Units are uprated from 158 MVA to 212.5MVA, 13.8 kV, 100 RPM. As a Senior Electrical Engineer responsible for providing electromagnetic uprate study, participation in system engineering, performing component engineering design for replacement of the stator winding with associate components, field winding refurbishment and supply of PDA equipment. Provide manufacturing support, review of the in house factory test reports, subcontractors reports, and construction design submissions, provision of technical support during site installation, performing loop test on existing stator core and equipment acceptance testing for the upgrade of the two units at this generating station.

Manitoba Hydro, Seven Sisters, G5, Manitoba, Canada, Senior Electrical Engineer. Replacement of the stator winding, main and neutral leads, neutral current transformers and PDA equipment. Unit is rated at 43 MVA, 11 kV, 128.6 RPM.

Responsibility include site inspection, condition assessment, responding to customer technical specification for quotation, participation in system engineering, performing detail component engineering design for new stator winding with skewed coils and associate components like parallel rings, coils support, wedging system, main and neutral leads, refurbishment of the field winding, neutral current transformers and PDA equipment. Provide manufacturing support, review of the factory test reports, subcontractors reports, and construction design submissions, provision of technical support during site installation and equipment testing for the hydro generator.

Souther California Edison, Mammoth Pool, G1, California, United States, Senior Electrical Engineer. Replacement of the stator core with clamping system, stator winding, main and neutral leads collector rings and brush rigging, ventilation system and field winding refurbishment. Unit is uprated from 66 MVA to 95 MVA, 13.8 kV, 360 RPM. Responsible for conceptual and detail design, preparation of the technical specification and assistance during procurement, review of the contractors design submissions, support of the in house manufacturing, technical supervision and engineering assistance during construction, preparation of the commissioning procedures and coordination of the equipment testing for the upgrade and life extension of a 95 MVA generator unit, with a scope of work comprising of stator core assembly with new clamping system, stator rewinding, rotor pole refurbishment, main and neutral leads including CT's replacement and supply of the PDA equipment.

NALCOR, Bay deEspoir, G1-G4, New Foundland & Labrador, Canada, Senior Electrical Engineer. Replacement of the formed wound stator winding and main and neutral leads. Units are rated from 85 to 102 MVA, 13.8 kV, 300 RPM.

Responsibility include site inspection, condition assessment, responding to customer technical specification for quotation, participation in system engineering, performing component engineering design for the new stator winding with associate components like parallel rings, coils support, wedging system, main and neutral leads and PDA equipment. Provide manufacturing support, review of the factory test reports, subcontractors reports, and construction design submissions, provision of technical support during site installation and equipment testing for the four hydro generators.

Fortis BC, Cora Linn - G1, G2, United States, Senior Electrical Engineer. Responsibility include site inspection, condition assessment, responding to customer technical specification for quotation, participation in system engineering, performing component engineering design for new stator winding with associate components like parallel rings, coils support, wedging system and main and neutral leads. Provide manufacturing support, review of the factory test reports, subcontractors

reports, and construction design submissions, provision of technical support during site installation and equipment acceptance testing for the two hydro generators. Both units were uprated from 15 MVA to 17.25 MVA, 7.2 kV, 0.9 pf.

TVA, Wheeler - U1, United States, Design Engineer. Responsibility include site inspection, condition assessment, responding to customer technical specification for quotation, participation in system engineering, performing component engineering design for new stator frame / core, new stator winding with associate components like parallel rings, coils support, wedging system, main and neutral leads, new CT's as well as selection of the PDA equipment. Provide manufacturing support, review of the factory test reports, subcontractors reports, and construction design submissions, provision of technical support during site installation and equipment testing for the upgrade of the one hydro generators. The unit output power was uprated from 36 MVA to 48.4 MVA, 13.8 kV, 0.95 pf.

Avista, Noxon, G1, G3, G4, Montana, United States, Design Engineer. Replacement of the stator winding, main and neutral leads and PDA equipment. Units are uprated from 88 MVA to 110 MVA, 14.4 kV, 100 RPM.

Responsibility include site inspection, condition assessment, responding to customer technical specification for quotation, participation in system engineering, performing component engineering design for new stator winding with associate components like parallel rings, coils support, wedging system, main and neutral leads, providing technical description for the uprate units design, review of the subcontractors like re-insulation of the field winding and provide specification for Vibro System and PDA equipment. Provide manufacturing support, review of the factory test reports, subcontractors reports, and construction design submissions, provision of technical support during site installation and equipment testing for the upgrade of the three hydro generator.

Exelon, Conowingo, G8-G11, Pennsylvania, United States, Design Engineer. Replacement of the stator winding, field winding refurbishment. Units are uprated from 62 MVA to 75 MVA, 13.8 kV, 120 RPM.

Responsibility include site inspection, condition assessment, responding to customer technical specification for quotation, participation in system engineering, performing component engineering design for new stator formed wound winding with associate components like parallel rings, coils support, wedging system, main and neutral leads, refurbishment of the field winding, design review of the subcontractors design and supply of PDA equipment. Provide manufacturing support, review of the factory test reports, subcontractors reports, and construction design submissions, provision of technical support during site installation and equipment testing for the upgrade of the four hydro generators.

Fortis BC, South Slocan, G1 - G3, United States, Design Engineer. Responsibility include site inspection, condition assessment, responding to customer technical specification for quotation, participation in system engineering, performing component engineering design for new stator winding with associate components like parallel rings, coils support, wedging system and main and neutral leads. Provide manufacturing support, review of the factory test reports, subcontractors reports, and construction design submissions, provision of technical support during site installation and equipment acceptance testing for the two hydro generators.

Pacific Gas and Electric Co, Ralston, G1, California, United States, Design Engineer. Replacement of the Roebel bars for stator winding with associated components, main and neutral leads, field winding refurbishment, Unit is rated for 88 MVA, 13.8 kV, 240 RPM. As a Design Electrical Engineer responsible for providing quotation, participation in system engineering, performing component engineering design for replacement of the stator winding with Roebel bars, associate components, field winding refurbishment and PDA equipment. Provide manufacturing support, review of the factory test reports, subcontractors reports, and construction design submissions, provision of technical support during site installation and equipment testing.

NYPA, Robert Moses, G11, G4, G5, G7, G9, Niagara Falls, United States, Design Engineer. Replacement of the stator core and stator winding with Roebel bars and associated components. Each of 5 units + spare stator is uprated from 168 MVA to 215 MVA, 13.8 kV, 120 RPM.

Responsibility include responding to customer technical specification for quotation, participation in system engineering, performing component engineering for new stator core, winding with Roebel bars and associate components like parallel rings, coils support, wedging system and main and neutral leads. Provide manufacturing support, review of the factory test reports, subcontractors reports for new stator core lamination, construction design submissions, provision of technical support during site installation and equipment testing for the upgrade of the five hydro generators.

OPG, Alexander Falls, G4, G4, Ontario, Canada, Design Engineer. Replacement of the stator winding, main and neutral leads and field winding refurbishment. Units are rated at 15 MVA, 12 kV, 150 RPM.

Responsibility include site inspection, condition assessment, responding to customer technical specification for quotation, performing component engineering design for new stator winding with associate components like parallel rings, coils support, wedging system, main and neutral leads and PDA equipment. Provide manufacturing support, review of the factory test reports, subcontractors reports, and construction design submissions, provision of technical support during site installation and equipment testing for two hydro generators.

Brookfield / Alcoa, Calderwood, G1- G3, Maryville, Tennessee, United States, Design Engineer. Replacement of the stator core, formed wound stator winding and associate components like connections, parallel rings, coils support / wedging system, main and neutral leads, replacement of the rotor rim, field poles, collector rings and brush rigging and improvement of the ventilation system. Units are uprated from 45 MVA to 58 MVA, 13.8 kV, 150 RPM.

Responsibility include site inspection, condition assessment of the OEM equipment, responding to customer technical specification for quotation, participation in system engineering, performing electromagnetic study, performing component engineering design for new stator core, new stator winding with associate components like parallel rings, coils support, wedging system, main and neutral leads, collector rings, brush rigging, design review of the subcontractors components and specification of the PDA equipment. Provide manufacturing support, review of the factory test reports, subcontractors reports, and construction design submissions, provision of technical support during site installation and equipment testing for the upgrade of the three hydro generators.

Siemens, Aramco, Siemens, United Arab Emirates, Project Engineer. Replacement of the stator winding with multi turn coils and associated components for turbo generator. Unit is rewound for 39.0 MVA, 13.8 kV, 3600 RPM.

Responsibility include responding to customer technical specification for quotation, participation in system engineering, performing component engineering design for replacement of stator winding with associate components like parallel rings, coils support, wedging system and main and neutral leads. Particular attentions is taken during a design process focusing on requirements for high speed machine like Aramco. Provide manufacturing support, review of the factory test reports, subcontractors reports, construction design submissions, provision of technical support during site installation and equipment testing for this turbo generator.

NYPA, Lewiston, G7, Lewiston, NY, United States, Design Engineer. Replacement of the form wound stator winding with associated components, connections and main and neutral leads. Unit is uprated from 25 MVA / 37,000 HP to 36 MVA / 48,250 HP, 13.8 / 13.2 kV, 112.5 RPM. As a Design Electrical Engineer responsible for providing uprate study technical report, participation in system engineering, performing component engineering design for replacement of the stator winding with

associate components, and selection of PDA equipment. Provide manufacturing support, review of the factory test reports, subcontractors reports, construction design submissions, provision of technical support during site installation and equipment testing for the upgrade of the one unit at this pump generating station.

USBR, Davis Dam, G2, G5, Nevada, United States, Design Engineer. Replacement of the formed wound stator winding, main and neutral leads and supply of the spare stator core. Units are rated to 48 MVA, 13.8 kV, 94.7 RPM.

Responsibility include site inspection, condition assessment, responding to customer technical specification for quotation, participation in system engineering, performing component engineering design for new stator core, new stator winding with associate components like parallel rings, coils support, wedging system and main and neutral leads. Provide manufacturing support, review of the factory test reports, subcontractors reports, and construction design submissions, provision of technical support during site installation and equipment acceptance testing for the two hydro generators.

Hrvatska Elektroprivreda Ltd., Dubrava U1 U2, Cakovec , Croatia, Project Engineer. 2 synchronous bulb-type generators 42 MVA, 6.3 kV, 50 Hz, 125/360 rpm, 2 generator step- up transformers 42 MVA, 121 (115)/6.3 kV, complete HV, MV, and LV equipment with PRO- MASTER control system.

Responsibilities include preparation of the tender designs and technical specifications, cost estimate for water-to-wire and design-build implementation contracts for two greenfield, run-of-river hydroelectric powerhouse, with total installed capacity of 84 MW. Provide manufacturing support, review of the factory test reports, subcontractors reports, construction design submissions, provision of technical support during site installation and equipment testing for two bulb type generators,

Empresas Publicas de Medellin, Playas G1-G3, Antioqia, Colombia, Project Engineer. 3 synchronous generators 82.9 MVA, 13.8KV, 60 Hz, 360/670 rpm, segregated generator bus work, excitation systems, 3 generator step-up transformers 82.7 MVA, 230+2.5/13.8KV, 1 auxiliary transformer 10 MVA, 230+8/13.8 KV, equipment for control, metering, protection and spare parts.

Responsibilities include responding to the customer technical specifications, cost estimate for design-build implementation contracts for three greenfield, underground hydroelectric powerhouse, with total installed capacity of 249 MW. Provide stator winding design with associate components, manufacturing support, review of the factory test reports, subcontractors reports, construction design submissions, provision of technical support during site installation and equipment testing for three vertical type generators, Technical coordination between OU in within Rade Koncar that supplied generators, GSU's, segregated bus work rated for 13.8 kV, excitation equipment and BOP electrical equipment. QA review of technical specification for installation as well as providing as built design to EPM.

Career History

2019 - Present	Hatch Ltd, Mississauga, Canada. Principal Engineer
1997 - 2019	Voith Hydro Inc., Mississauga, Canada. Senior Lead Engineer
1996 - 1997	Iris PE, Mississauga, Canada. Electrcial Engineer
1984 - 1993	Rade Koncar, Zagreb, Yugoslavia. Project Engineer

Technical Papers

Dino M. Slijepcevic / Jeff Fenwick, SCL Diablo - U31, U32 Rebuild, Canada, 2017

Dino M. Slijepcevic / Jeff Fenwick, Coil in a 200 MVA Generator, Mississauga, Canada, 2015

Languages

English

William Kussmann, PE

Senior Geotechnical Engineer

Education

BScE, Geotechnical, University of Minnesota, Minneapolis, MN, United States, 1997

BSc, Geology, University of Minnesota, Minneapolis, MN, United States, 1997

Summary of Experience

Bill is a senior geotechnical engineer who specializes in water retention structures and renewable energy projects. He is a registered Professional Engineer in (MN, IL, MO, WI, MI, OH, NY, ME, NC, IN, NE, IA, ND, SD, ID and AK)

Relevant Experience

Fargo-Moorhead Metropolitan Flood Diversion Authority, Fargo-Moorhead Metropolitan Flood Diversion Project, Fargo,ND, United States, Design Manager - Diversion Channel. Design Manager and Geotechnical Engineer of Record for Diversion Channel design. Included assessments of slope stability, seepage/piping, settlement, rebound/basal heave, and levee design to USACE standards. Also coordinated and oversaw geotechnical explorations consisting of soil borings, CPT, and vibrating wire piezometers.

Brookfield Renewable Energy, Medway Dam Downstream Training Wall, Medway, Maine, United States, Geotechnical Engineer. Performed analysis and design of a permanent soldier pile and lagging wall to replace a failed concrete retaining wall along the dam tailrace. Performed site- review and verification of design elements during construction.

Xcel Energy, Hayward Dam, Hayward, Wisconsin, United States, Geotechnical Engineer/Consultant. Performed site inspections related to earthen embankment abutment seepage for the FERC-regulated Hayward Dam. Seepage mitigation design included a drainage gallery, sheet pile cutoff wall concept design, and spillway apron grouting design.

Xcel Energy, Cedar Falls Dam, Dunn County, Wisconsin, Geotechnical Engineer/Consultant. Provided design review for stilling basin construction plans including rock excavation, grout curtain design and specifications, and excavation stability for the FERC-regulated Cedar Falls Dam.

New Yory Power Authority, Long Sault Dam Safety Barrier, Massena, New York, United States, Geotechnical Engineer. Performed construction observation of safety barrier anchors, including verification of adequate rock socket. Observed soil and rock socket drilling, casing installation, anchor chain installation, and tremie grouting methods.

Brookfield, GLHA Storage Reservoir Due Diligence, Various Locations in Maine, United States, Geotechnical Engineer. Performed site review of earthen embankments for storage reservoirs at nine sites in Maine. Reviewed embankment conditions, flow control structures, and seepage. Provided findings for due diligence report.

Xcel Energy, Wissota Hydropower Dam Hydro Lane Embankment, Chippewa Falls, Wisconsin, United States, Geotechnical Engineer/Consultant. Assisted with Part-12 inspection and identification of improvements required for the Hydro Lane Embankment at the FERC-regulated Wissota Dam. Developed embankment improvent options consisting of graded filter design, embankment regrading, and sheet pile core wall installation.

Xcel Energy, Chippewa Falls Dam, Chippewa Falls, Wisconsin, United States, Geotechnical Engineer. Coordinated geotechnical investigations for the earthen embankment abutments for the FERC-Regulated Chippewa Falls Dam. Provided stability analyses following geotechnical investigations and testing.

City of Des Moines, Levee C Flood Control Project, Des Moines, Iowa, United States, Lead Geotechnical Engineer. Served as lead geotechnical engineer for the Levee C portion of the City of Des Moines flood control project. Determined soil stratigraphy from explorations and performed seepage, stability, and settlement analyses for proposed levee raises. Evaluated under levee and through levee seepage concerns and evaluated mitigation strategies for design consideration. Alternatives consisted of sheet piling, slurry cut-off walls, seepage collection trenches, grout curtains, and zoned embankments.

Mouse River Flood Control Project, Minot/Burlington, North Dakota, United States, Lead Geotechnical Engineer. Served as lead geotechnical engineer for four phases of the Mouse River Enhanced Flood Control Project. Determined soil stratigraphy from explorations and performed seepage, stability, and settlement analyses for the proposed levees, closure structures, flood walls, pump stations, and gate wells. Design elements included seepage collection/pressure relief trenches, slurry cut-off walls, seepage blanket, slope stability improvements, graded filter design, and settlement mitigation using surcharge with wick drains. Assisted with construction observations and recommendations.

City of Thief River Falls, Thief River Falls Dam, Thief River Falls, Minnesota, United States, Geotechnical Engineer. Performed piezometer analysis/rehabilitation and retaining wall analysis for powerhouse at the FERC-regulated Thief River Falls Dam. Provided updated embankment stability analysis based on the piezometer observations and construction recommendations for rehabilitation of the downstream concrete retaining wall.

Xcel Energy, Cornell Dam Embankment Stability, Cornell, Wisconsin, United States, Geotechnical Engineer. Assisted with Part-12 inspections at the site and identified a slope stability failure mode for the right embankment/abutment at the FERC-regulated Cornell Dam. Oversaw site investigations and developed improvement options. Provided stability analysis and design for final buttress improvement.

Xcel Energy, St. Anthony Falls Depression Evaluation, Minneapolis, Minnesota, United States, Geotechnical Engineer. Performed an emergency response for apparent depressions on the FERC-regulated St. Anthony Falls Hydropower Dam. Conducted two separate phases of explorations and performed void-fill grouting design for large limestone block fill below earthen embankment. Observed the grouting program for conformance with design and project specifications. Evaluated post-grouting piezometer results and embankment stability.

Ames Construction, Olmsted Hydropower Powerhouse Replacement, Orem, Utah, United States, Geotechnical Engineer. Developed and observed pump test to design construction dewatering for the deep excavation at the Olmsted Hydropower facility along the Provo River.

Minnesota Power, Fish Lake Dam Embankment Evaluation, St. Louis County, Minnesota, United States, Lead Geotechnical Engineer. Reviewed previous embankment stability analysis and provided options to improve embankment stability for new Probable Maximum Flood (PMF) event for the FERC-regulated Fish Lake Dam near Duluth, Minnesota. Oversaw additional phase of CPT testing, performed updated seepage and stability analyses, and designed a buttress to increase embankment stability. Performed quality control inspections and assistance during buttress construction.

Xcel energy, Cedar Falls Dam Retaining Wall, Menomonie, Wisconsin, United States, Geotechnical Engineer. Evaluated apparent downstream retaining wall movement at the FERC-regulated Cedar Falls Dam. Reviewed data/site conditions and developed a monitoring program for the wall and embankment to assess magnitude and direction of wall movement. Provided stability analysis and options for repair/stabilization of the retaining wall.

Xcel Energy, Wissota Hydropower Dam, Chippewa Falls, Wisconsin, United States, Geotechnical Engineer. Performed hand auger investigations and coordinated topographical survey for the Rod and Gun Dike at the FERC-regulated Wissota Hydropower Dam. Evaluated stability of the embankment. Assisted with subsequent Part-12 evaluation and limited PFMA for the facility. Additional design of a modification to the dike was not required.

Oxbow-Hickson-Bakke Ring Levee (Fargo Moorhead Diversion), Oxbow, North Dakota, United States, Lead Geotechnical Engineer. Served as lead geotechnical engineer for a portion of the Oxbow-Hickson-Bakke Ring Levee (portion of the Fargo-Moorhead Diversion Project). Determined soil stratigraphy from explorations and performed seepage, stability, bearing capacity, and settlement evaluations for the pump station, gate well, and portion of the earthen levee. Design elements included settlement mitigation using surcharge with wick drains. Assisted with construction observations and recommendations.

Park Nicollet Hospital, Park Nicollet Hospital Flood Control Wall, Golden Valley, Minnesota, United States, Geotechnical Engineer. Coordinated and observed geotechnical investigations and provided analysis and design of a cantilever sheet pile flood control wall to accommodate the existing facility along Bassett Creek. Performed sheet pile driving verification during construction.

UPPCo, Escanaba Dam No. 3, Escanaba, Michigan, United States, Geotechnical Engineer. Observed soil borings and performed seepage and stability analyses for the FERC-regulated Escanaba Dam No.3 facility. Reviewed potential failure modes from previous inspections. Based on the analysis, additional design elements were not required.

Xcel Energy, Dells Dam, Eau Clair, Wisconsin, United States, Geotechnical Engineer. Performed emergency response for a rockslide event near the right abutment of the FERC-regulated Dells Dam. Assisted with a soldier pile and lagging wall design to buttress rock slope at the abutment.

Xcel Energy, Trego Dam, Washburn County, Wisconsin, United States, Geotechnical Engineer. Performed analysis of seepage from the right embankment at the FERC-regulated Trego Dam. Provided seepage control improvement options and designed upgrades to the drainage and site access systems, including a cable concrete mat with underlying granular filter which will also serve as a canoe portage.

UPPCo, Boney Falls Spillway Stability, Delta County, Michigan, United States, Geotechnical Engineer. Performed drilling/coring analysis to assess potential lift-joint instability of the existing FERC-regulated Boney Falls spillway. Pressurized upward seepage was observed and subsequent analyses and remediation options were provided in an investigation report.

Minnesota Power, Sylvan Dam Evaluation, Cass County, Minnesota, United States, Geotechnical Engineer. Coordinated and observed a detailed subsurface investigation for abutments, foundation soils, and potential lift-joints for the FERC-regulated Sylvan Dam. Soil borings and CPT investigations were performed both on the embankments and on a barge in the reservoir to assess soil conditions. Coring of the dam and vibrating wire piezometer installation was performed to assess uplift pressures below the concrete spillway sections.

Xcel Energy, Holcombe Dam Piezometers/Seepage, Holcombe, Wisconsin, United States, Geotechnical Engineer. Evaluated existing piezometer data and installed replacement piezometers for the right earthen embankment at the FERC-regulated Holcombe Dam. Evaluated toe drain flow and embankment seepage and designed a system of weirs to assess seepage and potential migration of soils. Assisted with the site review and PFMA for the Part-12 evaluation.

Xcel Energy, Chippewa Falls Dam, Chippewa Falls, Wisconsin, United States, Geotechnical Engineer. Evaluated existing conditions to raise right embankment of the FERC-regulated Chippewa Falls Dam for new maximum flow conditions. Designed additional fill materials and geotextile separator covered with rip rap and performed stability analysis for post-construction conditions.

UPPCo, Bond Falls Spillway Replacement Project, Ontonagon County, Michigan, United States, Geotechnical Engineer. Performed subsurface exploration, testing, analyses, and reporting for the FERC-regulated Bond Falls Spillway Replacement project. Design included a sheet pile cofferdam, OSHA deep excavation for spillway removal and construction, bedrock seepage evaluation from packer testing, graded filter, spillway overflow lining, TAM grouting for excavation stabilization, and building foundation support. During construction, performed bedrock evaluation/mapping, review of OSHA excavations and seepage, grouting, and general spillway construction. Following construction, prepared the reservoir refill plan and performed additional monitoring of seepage on embankments for 3 years following construction.

Xcel Energy, Menomonie Dam, Menomonie, Wisconsin, United States, Geotechnical Engineer. Performed site review of left abutment conditions and right abutment drain at the FERC-regulated Menomonie Dam. Provided an assessment of the need for improvement and remediation options for the left abutment drain system.

Moore Engineering, Wild Rice River Flood Control Dam, Richland County, North Dakota, Bahamas, Geotechnical Engineer. Served as the supervising geotechnical engineer for a potential flood control dam for the Red River of the North river system. Coordinated and observed geotechnical investigations, assigned laboratory testing, and performed preliminary seepage, stability, and settlement analysis for conceptual embankment design options.

City of Clarkson, Levee Recertification, Clarkson, Nebraska, United States, Geotechnical Engineer. Served as the geotechnical engineer for levee recertification for the city of Clarkson, Nebraska. Determined soil stratigraphy from explorations and performed seepage and stability evaluations for the levee recertification process.

Associated Constructors, Tourist Park Reconstruction Cofferdam, Marquette, Michigan, United States, Design Geotechnical Engineer. Performed analysis of site conditions and earthen cofferdam design for reconstruction of the FERC-regulated Tourist Park Dam. Observed cofferdam construction, monitoring and performed analysis for evaluation of extension of the usage-life of the structure to a second construction season.

FHR Terminals, St. Paul Terminal Flood Control Berm, St. Paul, Minnesota, United States, Geotechnical Engineer. Performed soil explorations and provided a design for a combination soil berm and sheet pile flood control structure to accommodate existing facilities along the Mississippi River. Performed under-seepage analysis, cantilever sheet pile wall design, and robotic total station monitoring of pile driving adjacent to large above-ground storage tanks during construction.

City of Redwood Falls, Redwood Falls Dam Powerhouse Reconstruction, Redwood Falls, Minnesota, United States, Geotechnical Engineer. Coordinated and observed soil borings and rock coring and provided geotechnical recommendations for the powerhouse and turbine reconstruction at the FERC-regulated Redwood Falls Dam.

Xcel Energy, Big Falls Dam Depression Evaluation, Rusk County, Wisconsin, United States, Geotechnical Engineer. Performed emergency response for apparent depressions forming on the main earthen embankment of the FERC-regulated Big Falls Dam. Performed two separate phases of investigations to evaluate depressions and existing rock-filled toe drain. Design included a drilled and backfilled repair for the depressions. During construction, the drilling and backfill placement was observed and relative compaction was tested. Assisted with the Part-12 site review and limited PFMA following repair work.

Ames Construction, Devils Lake Levees as Roads Project, Devils Lake, North Dakota, United States, Geotechnical Engineer. Utilized existing USACE soil boring and lab testing information to design levees which would serve both as earthen cofferdam during construction and permanent roadways following construction. Observed final cofferdam construction and conditions following winter season to verify use during spring construction.

UPPCo, McClure Dam Penstock Replacement, Marquette County, Michigan, Lead Geotechnical Engineer. Performed subsurface explorations, analyses, and reporting for soil conditions for the penstock replacement at the FERC-regulated McClure Dam. Design recommendations included penstock bedding and backfill recommendations, sheet pile retaining wall design for earthen embankment, pipe supports through wetland areas, and railroad pipe jacking recommendations. During construction, performed observation of sheet piling installation, sheet pile deflection monitoring, piezometer monitoring, embankment seepage monitoring, excavation/rock removal evaluations, and general penstock construction.

Career History

2019 - 2021	Olsson, Olathe, Kansas, United States. Senior Geotechnical Engineer
2007 - 2019	Barr Engineering, Minneapolis, Minnesota, United States. Senior Geotechnical Engineer
2002 - 2007	GEOCON Professional Services, Champaign, Illinois, United States. Geotechnical/Material Testing Department Manager
2000 - 2002	GZA GeoEnvironmental, Pewaukee, Wisconsin, United States. Project Engineer
1998 - 2000	Midwest Engineering Services, Grand Rapids, Michigan, United States. Project Engineer
1997 - 1998	Schlumberger, Tyler, Texas, United States. Wireline Field Engineer

Languages

English

Christian Murphy P.E.

Electrical Engineer

Education

Bachelor, Electrical Engineering, State University of New York at Buffalo, Buffalo, New York, United States, 2013

Professional Affiliations

Registered Professional Engineer - State of West Virginia - Member

Registered Professional Engineer - State of New York - Member

Summary of Experience

Christian is a Licensed Professional Engineer with approximately 10 years of experience in engineering and design in the electrical power industry with a focus in Hydropower. He has experience in supporting projects from inception to completion including feasibility studies, conceptual design services, detailed design services, procurement support, and construction support. During his time at Hatch, Christian has been involved in a variety of projects including medium & low voltage power distribution, underground power distribution, substation design, balance of plant modification, UPS design, lighting design, Instrumentation design, cost estimation, specification development, distribution system operations, and drafting technical reports. Christian has experience with computer modelling utilizing popular software tools such as ETAP and SKM to perform short circuit studies, ground map design, load flow studies, arc flash studies, and protection & coordination studies.

Christian's recent experience includes work on the Hawks Nest G1 & G2 Frequency Conversion project and the Hawks Nest 460V 25Hz Arc-Flash Project where he serves as the Project Manger and Lead Electrical Engineer. Both of these projects feature a facility which non-standard equipment and limited available site information which required extensive coordination with the client and with Hatch Subject Matter Experts (SMEs).

Relevant Experience

Brookfield , Hawks Nest G1 & G2 Frequency Conversion, Gauley Bridge, West Virginia, United States, Project Manager/Lead Electrical Engineer. The project goal was to develop a turbine & generator procurement performance specification, balance of plant conceptual design, and high voltage interconnect conceptual design for the re-wind of two of the four hydro units at the client's facility from 25Hz to 60Hz. Key tasks included:

- Lead Turbine and Generator Procurement Specification effort. Tracked and managed design issues, coordinated across multiple disciplines to resolve. Ensured technical consistency, quality, and tone across all sections.
- Worked with the client and Hatch Subject Matter Experts to evaluate potential options for the Generator & Turbine rewind/refurbishment scope and resolve technical questions/issues. Assisted in selection of final option.
- Development of balance of plant conceptual design including evaluation of limited available space at site and perspective construction phasing to locate the major new equipment. Prepared single line, site plan, section, and arrangement drawings as required.
- Conceptual design of new generator switchgear including sizing, selection of major components (PTs, CTs, Surge capacitor, relays), and routing of all associated power feeders (GSU, G1, G2, station service). Prepared single line drawings as required.
- Conceptual design of existing switchyard layout changes to accommodate new 138kV equipment in an existing 69kV yard including replacement of two 69kV 30MVA GSUs with one 138kV 80MVA GSU. Engaged with vendors on potential equipment sizes and lead times. Prepared single line, site plans, section, and arrangement drawings as required.
- Conceptual design of new 138kV substation which would interface the new generators with an existing 138kV transmission line and re-supply existing customer loads. Prepared single line, site plans, section, and arrangement drawings as required.
- Development of Controls strategy and generator controls specification. Worked extensively with the client and Hatch Subject Matter Experts to develop a strategy in line with other facilities. 1Completed conceptual level short circuit study in ETAP.
- Prepared procurement specification for Generator Set-Up Transformer (GSU) and gas-insulated circuit breakers.
- Performed project management responsibilities including schedule and budget management.

Associate System Operator.

- Monitored, coordinated, and dispatched the real-time operation of NYPA generating units, including over 5,000 MW of hydro and 700MW of fossil fuel generation capacity.
- Monitored and coordinated the real-time operation of NYPA transmission assets including 1115kV, 345kV, and 765kV Transmission lines, capacitor banks, FACTs systems, and Inductor banks.
- Communicated generator and transmission line changes, problems, and capacity shortages with NYISO.
- Coordinated operations of The Niagara Falls Power Project with Niagara River Control to ensure regulatory flow requirements were meet while maximizing available generation capacity.
- Verified day ahead bid parameters met outage requirements and took corrective action if necessary.
- Assisted Senior System operator in response to system anomalies, emergency conditions, and ratings violations.

Brookfield , Hawks Nest 460V 25Hz Arc Flash upgrades, Gauley Bridge, West Virginia, United States, Project Manager/Lead Electrical Engineer. The project goal was to enhance worker safety while working on the facility auxiliary power system. The client operates a 25Hz 102MW generating facility which still utilizes 25Hz 460V to operate the plant axillary loads. The distribution equipment is plant original and of 1930s vintage, which results in high arc-flash hazard and extensive downtime to work on equipment safely. Contracted to design replacement of the existing distribution system to reduce the arc-flash hazard and improve operations with remote control capability and greater load selectivity. Key tasks included:

- Performed site investigations and reviewed existing facility drawings to determine existing site conditions. Many facility drawings were out of date and several systems had no documentation. Worked with the client technical and operational personnel to define project goals as eall as accurate site conditions.

- Developed an evaluation of options report which evaluated two options, replacement with 25Hz switchgear and modernization of the system for 60hz operation. The report evaluated equipment availability, constructability, downstream load impact, controls impacts, replicability impacts, construction phasing to reduce outage time, and expected service life. Worked with vendors to determine equipment availability and suitability.
- Developed conceptual single line and plan drawings for both options.
- Performed project management responsibilities including schedule and budget management.

MTA, Office of the Power Director, New York, New York, United States, Electrical Engineer. Project goal was to improve electrical safety at the New York Metro Transit Authority (MTA) East Side Access (ESA) Project. The ESA distribution system is extensive and feature over 40 individual substations with multiple utility supplies, extensive interconnection capabilities, and multiple stand-by generators. Involved in the project from early commissioning of substations to final testing. Key tasks included:

- Developed and implemented an electrical work permitting process for operation on or working in the vicinity of medium voltage equipment and low-voltage substations with back-feed potential. The process was based on OSHA, NFPA 70E, NEC, IEEE, and other relevant utility standards to facilitate safe work on and in the vicinity of electrical equipment.
- Reviewed Contractor work plans for compliance with electrical work process standards. Worked with Contractors and the Client to resolve disputes and ensure work was performed in the safest possible manner.
- Developed permitting database and document controls system, the project handled several hundred individual permits. System was capable of calculating performance metrics and status reports.
- Lead work permit process including review of plans, management of site personnel, and management of the permit system.
- Reviewed work plans for work along track right-of-way for adequate isolation from traction power.
- Frequently visited site to audit work performed by Contractors.

Brookfield , Hawks Nest Substation Upgrades and Electrical Modifications, Gauley Bridge, West Virginia, United States, Electrical Engineer. Project goal was to replace end-of-life equipment and reduce the required time/scope of outages at the Client's 25Hz at 69kV switchyard. The existing substation is of 1930s vintage with much of the existing antiquated equipment and controls remaining in service until the upgrade. The substation structure was of steel lattice construction with very constrained spacing. Key tasks included:

- Design to retro-fit new Motor Operated Disconnect switches (MOD) into the existing substation structure including new bus connections, new control wiring, new control logic, remote control & indication, and new motor operators.
- Design to remove and replace existing Oil Circuit Breaker (OCBs) with new SF6 breakers.
- Design of switchyard modifications to provide adequate maintenance clearance for work while one bus is energized. Existing double-bus double- breaker architecture was replaced with a single bus and breaker, and a bus-tie was installed. Design included evaluation of NESC clearances and relocation of some equipment to facilitate access and clearance.
- Design to replace existing insulators with new insulators. New insulators were longer and required extensive design to retro-fit into existing lattice structure.
- Modifications to the existing control boards in the Control Room including new control circuits, new control switches, new indication, and changes to the existing mimic board to implement the new substation arrangement.

- Design of modifications to the existing substation interlock logic to facilitate the removal of extraneous breakers and implementation of a new bus-tie switch. Including modification to the novel automatic analog voltage regulation system and generating unit synchronization scheme.
- Development of complete IFC package including drawings and specifications.

New York Power Authority, St. Lawrence Control Room Renovation, Massena, NY, United States, Electrical Engineer. The project goal was operational and ergonomic improvements to an existing control room. The improvements included architectural changes, new sit-stand workstations, new video wall system, new UPS system with associated battery, and new data concentrator. Performed all electrical scope and managed architectural and video wall subconsultant scope as prime contractor. Key tasks included:

- Worked closely with the client technical and operations staff to determine the requirements for the new video wall. Worked with subconsultant to meet client requirements.
- Performed all integration works for the video wall including power and display inputs.
- Designed a new UPS system to support the new video wall. Design included an assessment and load study of the existing UPS systems. Evaluated multiple UPS systems and battery types to determine the best system for the project. Evaluated NEC and NYS fire code requirements to ensure compliance. Designed modifications to an existing battery room to accommodate a second battery bank.
- Preformed detailed electrical design in support of the new UPS system including battery sizing, redundant 480V power feed, new UPS power panel, conduit & cable routing, and all required electrical calculations.
- Designed a new Data Acquisition System to replace paper-based chart recorders. Worked closely with client engineers to determine the system requirements and equipment. The system selected utilizes Schweitzer Engineering Laboratories (SEL) Real-Time Automation Controller (RTAC) and Axiom Input/Output modules. Preformed detailed design to connect over 100 field signals to the new system. The design included updating client schematics, wiring diagrams, and routing the appropriate cabling to all the required signal sources. Created wiring drawings for the equipment rack.
- Coordinated the electrical and architectural design with architectural sub consultant. Ensured a consistent drawing package that complied with client standards.
- Created complete IFC package including technical drawings and specifications.
- Completed construction support including review of contractor submittals, responding to contractor Requests for Information(RFI), preparation of Design Change Notices(DCN), and multiple site visits to evaluate the construction progress.
- Prepared record drawings based on the Contractor's red-line mark-ups

Brookfield, Hawks Nest PJM Interconnection Assessment, Gauley Bridge, West Virginia, United States, Electrical Engineer. The project goal was to evaluate options to interconnect the clients generation facility with the local PJM operated power grid and obtain an Interconnection Service Agreement (ISA). The client operates a 25Hz 102MW Hydropower facility, evaluated options to accomplish a 60Hz interconnection including generator re-winds and frequency converters. Assisted the client in submitting the interconnection requires to PJM, provided support as needed during the queue process. Key tasks included:

- Reviewed all PJM manuals to determine interconnection requirements. Specifically, reviewed power factor, communications (SCADA), metering, and protection requirements.
- Evaluated the existing facility drawings and communicated with the client to get an accurate view of existing site conditions. Created a new single-line drawing to summarize the existing facility conditions as they relate to the

interconnection. Prepared conceptual SLD for each option. Determined the requirements from the local Independent System Operator(ISO), PJM, and local Transmission Operator (TO) American Electric Power (AEP), for interconnection for each option.

- Drafted a report which compared the different options including interconnection requirements, constructability, schedule, risks, cost, and Net Present Value (NPV).
- Developed all information required for a PJM interconnection request. Provided support to the client on an as-needed basis while in the queue process.

New York Power Authority, BG Upper Complex Repurpouse, Gilboa, NY, United States, Electrical Engineer. The project goal was to re-purpose several existing and un-utilized buildings to meet current site needs. The design included retrofit of an existing warehouse to add an assembly space, retrofit of an existing office building to a vehicle storage building, and retrofit of a back-up control room in an existing office, new kitchenette for the assembly space, new bathrooms for the assembly space, HVAC upgrades for the assembly space, and a new water supply well. Key tasks included:

- Designed a new power feed and distribution for the new assembly space. Including 480V power panel, 208V power panel, and power to all new devices (HVAC, fans, lights, receptacles, etc).
- Performed normal and emergency lighting design to New York State Building code requirements in line with the new occupancy class.
- Design of toxic gas detection (NO2 & CO2) and ventilation systems for the assembly space, remaining warehouse space, and vehicle storage building in compliance with NEC and NYS Building Code requirements. Worked with mechanical disciplines to select and size solutions.
- Coordinated design between mechanical, fire alarm, and architectural subconsultants to ensure a consistent and quality design package. Worked with subconsultants and the client to resolve questions and design issues.
- Preformed load study per NEC 220.87, evaluated the additional load as part of this project and ensured the existing service is sufficient.
- Created a complete IFC package including technical drawings and specifications.
- Completed construction support including review of contractor submittals, responding to contractor Requests For

Information(RFI), and preparation of Design Change Notices(DCN).

Rochester Gas & Electric, RG&E Station 2 New Unit - Phase 1A, Rochester, NY, United States, Electrical Engineer. The project goal was a major facility repair works, including replacement of the penstock, replacement of existing fish chute, replacement of existing trash chute, and provisions for installation of a second future unit. Electrical scope included re-routing of disturbed underground utilities to accommodate the new civil works, integration works for new fish chute, and integration works for new Turbine Inlet Valve (TIV). Key tasks included:

- Designed the power supply and controls for all the motor actuators associated with new trash chute & fish chute, including appropriate disconnecting means. Utilized Modbus protocol and proprietary push button control stations.
- Designed the power supply and controls for the Turbine Inlet Valve (TIV). The TIV was integrated into the generator logic to ensure safe operations. TIV was also integrated into local SCADA.
- Designed new conduit system and cabling to connect the remote Rack house (intake structure) to the Powerhouse. Required extensive coordination with civil disciplines due to the new penstock works, new fish chute arrangement, and challenging site grade.
- Re-designed local underground conduit system to re-connect the powerhouse to the facility substation, including power and control leads. Provisions were made for potential future works.

- Created a complete IFC package including technical drawings and specifications

New York Power Authority, Electrical Power Service to New STL-FDR Warehouse & Security Building, Massena, NY, United States, Electrical Engineer. The project goal was to provide a medium-voltage service to a new Security & Warehouse facility. The medium voltage service utilized a spare breaker in an existing medium voltage switchgear to supply a new outdoor medium voltage switchgear and transformer. Key tasks included:

- Feasibility study and evaluation of options.
- Detailed medium-voltage feeder design including load study, equipment sizing, cable sizing, conduit sizing, voltage drop, cable pull tension, protection & Coordination Study, and Arc flash study.
- Designed protection and controls for the medium voltage supply breaker, including selection of the protective relay, relay programming, local control switches, remote control switches, remote annunciation, metering, and arc-flash reducing maintenance mode.
- Produced a model of the relevant portions of the existing medium voltage distribution system in SKM Power Tools. Produced detailed design drawings and specifications per client standards. Detailed design drawings included site plans, site layouts, single-line drawings, three-line drawings, block diagrams, burial details, conduit plans, wiring details, panel arrangements, and cable & conduit schedule.
- Completed construction support including review of contractor submittals, responding to contractor Requests For Information(RFI), preparation of Design Change Notices(DCN), and multiple site visits to evaluate the construction progress.
- Prepared record/as-built drawings based on the contractors red-line mark-ups.

Career History

2015 - Present Hatch, New York, United States. Electrical Engineer

2013 - 2015 New York Power Authority, New York, United States. Assistant System Operator

Languages

English

Rauf Ahmed

Electrical Engineer

Education

BSc, Electrical, University of Engineering and Technology, Lahore, Pakistan, 1992

Professional Affiliations

EGM - Engineers and Geoscientists Manitoba - Member

Summary of Experience

Rauf is an electrical engineer with 29 years experience in the field of generation, transmission and distribution systems, water control structures and industrial process instrumentation and control (26 years in contracting/consulting firms and 3 years in an electric utility). Areas of expertise include project management, design engineering studies, concept engineering, detail engineering, cost estimates, control and protection systems for 75/500/380/230/115-kV ac stations, hydro stations and water control structures, HVdc converter station layouts, 230 and 115-kV transmission lines, HVDC ground electrodes, grounding systems, 230-kV and 115-kV power cable systems, overhead and underground distribution systems, industrial instrumentation and control systems, and SCADA and communication systems for various power utilities.

Relevant Experience

Powell Industries, Coteau Creek Hydro Station Protection Design, Saskatoon, Saskatchewan, Canada, Lead Electrical. Powell was engaged by SaskPower as EP service provider for the supply of the protection panels, neutral grounding cubicles, generator switching and surge protection equipment, unit auxiliary transformer and unit auxiliary switchgear assemblies. Powell engaged Hatch to provide engineering services for the protection panel engineering. I am leading the team to deliver protection philosophy, single line diagram relaying and metering, trip matrices, panel GA, panel schematics and wiring diagrams, protection report and relay settings.

Brookfield, Hawks Nest G1 and G2 Frequency Conversion, United States, Senior Electrical engineer. The project is designed for convert the existing 25 Hz units to 60 Hz unit and equip the units with modern protective relaying and digital control system. In addition the switching station will be converted from 69 kV to 138 kV for connection to 138 kV grid. My engagement includes development of conceptual design of the facility and coordination with the client, development of specification for the long lead items, and support the team in detailed engineering of the facility.

Hydro One, Transmision Line Relocation, Toronto ON, Canada, Lead Eelectrical. The project scope include conversion of the existing 115 kV double circuit overhead transmission line to underground to eliminate the interference with rail corridor infrastructure being developed under RER initiative. The scope includes assessment of transmission line for interference with the proposed traction power and rail infrastructure, conversion of overhead to UG circuit for a section of 2.4 km where interference can be mitigated, develop overhead to underground transition junctions and reconfiguration of overhead transmission line for interface with the junctions. Rauf Ahmed as the electrical lead is responsible for transmission line evaluation, reconfiguration, UG circuit and junction design.

ABB, Mystic SFC and Excitation System Replacement, Boston , United States, Technical advisor. ABB engaged Hatch to provide engineering services for the interface engineering to replace the existing static frequency converter (SFC) and excitation system approaching end of their useful life with new ABB equipment for Block 8 and Block 9 combined cycle units, six in total. Hatch mandate included site visit to establish the replacement scope encompassing modifications to plans and elevations , protective relaying scheme, controls and balance of the plant and development of the SFC and excitation system interface schematics. Hatch developed construction work package for Block 8 and is working on Block 9 construction work package. Rauf Ahmed provided expert technical advise on the integration of the equipment and reviewed the construction work packages.

Manitoba Hydro, Keeyask Generating Station, Winnipeg, MB, Canada, Electrical Lead Engineer. Keeyask hydro station includes a seven unit powerhouse and seven bay spillway complex. The responsibility included protective relaying system and 138 kV grid interconnection design; review of T&G, GCB, GSU, excitation system and governor specifications developed by the client and develop tender drawings for interfacing the equipment with the balance of the plant including protection and control systems; and review of unit control and monitoring system designed by peers. Hatch is providing services for procurement support, manufacturer and supply support, detail engineering and construction support.

YEC, YEC Interconnetcion Guide and System Modelling, Yukon, Canada, Electrical Engineer. Hatch updated the PSEE model and updated for addition of hydro generation proposed by IPP and the interconnection guide for the generation and load substation integration into YEC system. I updated the load flow (balanced), unbalanced fault and dynamic model incorporating the elements of the new generation facility and performed analysis to quantify impact on the YEC system.

Moasic Potash, Moasic Colonsay 230 kV Cable Failure RCA, Saskatoon, SasKkatchewan, Canada, Lead Investigator. The 230 kV transformer Pfisterer terminal at the transformer end failed, cable turret was an isolated oil chamber. The task included site visit to assess the arced terminals, perform measured of XLPE insulation expansion, collaboration with the vendor to get design information, perform root cause analysis to establish the sequence of event leading to the failure, and develop guidelines for mitigation and maintenance measures.

SaskPower, Coteau Creek, Saskatchewan, Canada, Electrical Lead. Hatch is performing OE role and providing engineering services for some of the packages. The project includes two stages: definition phase encompassing condition assessments, alternative reviews and selection of credible option, and implementation phase encompassing the tender packages for the major equipment and construction work packages for project execution. I, as lead electrical engineer, have the responsibility of delivery of generator, excitation system, generator step-up transformer, generator switchgear, protective relaying and control and 25 kV distribution cable packages. As part of the project, used PSCAD package to model the system for TRV study.

NTDC, Lahore Matiari HVDC Link, Lahore, Pakistan, Lead Ground Electrode Engineer. Hatch is providing OE services for the NTDC and my role includes engage with the EPC contractor to finalize the design basis and review the studies and documents. The work completed to date includes review of ground electrode and ground electrode line design basis, ground

electrode design study, grounding electrode electrical interference and corrosion impact study, grounding electrode facility design and grounding line design.

NB Power, NB Power -Generation Technology Review, New Brunswick, Canada, Electrical Engineer. Hatch is providing the consulting services for reviewing the credible generation and reactive power support alternative available, develop the conceptual design at a high level to establish the equipment and systems required and estimating the alternative. Hatch has been providing this service from 2007 onward after a three year interval; the recent update was completed during 2019. As part of this review, Hatch completed the review of a gas turbine and hydro generator conversion for synchronous operation during 2016 review including engagement with the vendors of Clutch manufacturer, pony motor (Weg) and other equipment and system for soliciting technical information and costs.

City of Montreal, Atwater Induced EMF, GPR Transfer and Lightning Transient Analysis Study, Montreal, Canada, Electrical Lead. The project was designed to assess the electric and magnetic field (EMF) at the water control structure under a 315 kV transmission line for the safety of public and operation and maintenance folks, conductive GPR transfer from an adjacent pole fault and review impact of the lightning on the transmission line on the instrumentation and infrastructure inside the water control structure. Hatch deployed HIFREQ module to analyze the power frequency (60 Hz) EMF under steady state and fault scenarios. Lighting impact was studied utilizing FFTSES and HIFREQ modules.

City Of ChilliWack, City of Chilliwack Proposed Kinder Morgan Pipeline, ChilliWack, Britsh Columbia, Canada, Electrical Lead. The project was designed to review the ROW study completed by BC Hydro for the city of ChilliWack alignment and provide overview to GPR distribution changes along the ROW due to pipeline and qualitative analysis on the public safety. A summary report was developed to summarize the findings and recommend mitigation measures.

SaskPower, EB Campbell Units 1-6 Life Extension and Modernization, Nipawin, SK, Canada, Electrical Lead and PM. Hatch worked as Owners Engineer for the life extension and modernization (LEM) project. The scope includes tendering support; detailed condition assessment based on site investigations and through review of the documents; bid evaluations and development of technical bid evaluation report (TBE); design optimization following the selection of a successful proponent; performance validation support through model test; quality assurance of design deliverables during T&G engineering phase, and support during construction. Hatch is also responsible for the balance of plant engineering which will be scope after the selection of LEM solution. My responsibilities include delivering the electrical deliverables with inputs from subject matter experts and coordination with other disciplines.

New York Power Authority, NYPA RMNPP Controls and Control Room Upgrade, Niagrafall, NY, United States, Electrical Lead. The project was designed to assess the condition of the unit controls and unit auxiliaries including governor and excitation system; to review the unit auxiliaries design; propose upgrades, and; develop Cape plan for life cycle of 40 years. The existing unit controls were vintage hardwired controls with multiple PLC systems to provide visibility from the control room and the off-site control center. My responsibility as electrical lead included site walk-through, data collection and interviews with operation, maintenance and management stakeholders; assess condition of the unit auxiliaries and controls based age, physical inspection, operation and maintenance history and available test records, and; development of design concepts for controls and disturbance monitoring equipment.

SaskPower, EB Campbell Unit 1-6 Upgrade, Saskatchewan, Canada, Lead Electrical. The project was designed to develop rehabilitation and life extension specification for the existing Units 1-6. The assignment includes review of the existing generator, generator auxiliary systems, protection system and station services with SaskPower for assessing the condition

and identifying issues with the design and operation of the units, and ; developing a specification for the different life extension alternatives including uprating the units.

Valard, Groundbirch Transmission Line, BC, Canada, Electrical Engineer. The project involves 230 KV lines and the line sectionalizing switches. The engineering tasks completed include EMF assessment of the right of the way (ROW), pipe line interference study for direct buried line in the right of way, and assessment of charging current for the selection of the disconnect switches capable to be operated without de-energizing the line.

EMERA, Maritime Link Project CBOD and FBOD, Nova Scotia, Canada, Lead HVdc grounding site engineer. The project involved the electrical field and impact assessment studies, development of design criteria and conceptual design of the grounding sites associated with planned VSC link between Newfoundland and Nova Scotia. My assignment included leading the study covering sea and soil modeling, defining basic design parameters of the electrode, GPR modeling, and impact assessment; supervision of the conceptual electrical engineering, and; coordination with civil/structural team for developing breakwater concept.

Mosaic, K3 Mine Site-Main Intake Substation, Esterhazy, Saskatchewan, Canada, Lead Electrical Engineer. The substation project was design to supply the new K3 mine infrastructure initially from the SaskPower 138 kV grid and ultimately from the 230 kV grid. The substation was comprised of three (3) bays 230 kV indoor GIS bays in radial bus configuration, an outdoor 230 kV rated air insulated disconnect switch for service entrance isolation, two (2) dual voltage 138/230-14.4 kV 42/56/70 MVA transformers, and 230 kV cable connections between the transformers and the GIS bays. The engineering service included studies including insulation coordination, grounding, and 230 kV cable sizing, lightning protection, battery sizing and ac auxiliary system sizing and, the 14.4 kV neutral grounding resistor sizing; equipment specification and system concepts; technical support for equipment procurement including review of bids, review of shop drawings, evaluation of factory inspection and test plans, and witnessing factory testing; support for the site construction activities, and; leading the field testing and commissioning efforts.

Nalcor Energy, Nalcor Energy - Labrador - Island Transmission Link, Newfoundland, Canada, Project Lead. The project was designed to study the shoreline pond electrodes associated with the Lower Churchill Project in order to provide for environmental assessment of the installations. The analysis completed part of this study included definition of the electrode duties with the client inputs; developing conceptual design of the installation; geophysical and geological review to define the sea and soil model; modeling the electrodes sites to study GPRs and current distribution in the sea body of water and the surrounding geological structures; electrical interference and corrosion impact assessment; chemical emission analysis; magnetic field modeling to predict magnetic field in the sea body of water, and physical emission modeling.

Manitoba Hydro, Dorsey 500-kV Breaker Replacement, Winnipeg, Manitoba, Canada, Senior Engineer. The project was designed to replace the single interrupter air blast 500-kV breaker with two interrupter SF6 live tank 765-kV breaker for use in 500-kV system. Assignments included review of the breaker vendor drawings for compatibility with the existing infrastructure; modification to breaker vendor schematics; and revision to layouts, ac and dc auxiliary systems, HVdc reduction scheme, auto reclosing scheme, and system overvoltage protection scheme.

Manitoba Hydro, Mechanical Key Interlock study, Seven Sister Generating Station, Manitoba, Canada, Senior Engineer. Reviewed the existing 115-kV switchgear mechanical key interlocks for equipment and operator safety; identified the existing scheme issues and proposed upgrades to address the safety concerns; compared the mechanical key interlock system with Manitoba Hydro padlock and hold card system for safety and operational flexibility; and compiled a report to document the review and recommend the preferred option.

Amherst Island Wind Farm Project, Toronto, Ontario, Canada, Senior Engineer. Reviewed various options of collector station on the island 230-kV transmission link and 230-kV switching station for connection to Hydro One system; developed conceptual single line diagrams and plans; and estimated capital cost of the infrastructure. The project involved 230 kV submarine cable circuit and Hatch developed conceptual design, technical requirements including landing site details.

Ivanhoe Mining, Ivanhoe Mongolian Mining Project, Mongolia, Supervising Engineer. Reviewed different 230-kV switching station options including static var compensator (SVC); developed single line diagrams and plans; developed cost estimates; and produced a report to document the above.

Manitoba Hydro, Geatfall DC Zoning Upgrade, Manitoba, Canada, Senior Supervising Engineer. Existing DC distribution was upgraded to enhance system reliability. Tasks included panel engineering, DC circuit reorganization to establish separate zones for generators and 115kV lines, and overcurrent device coordination.

Manitoba Hydro, Dorsey Relay Building Upgrade Study, Winnipeg, Manitoba, Canada, Supervising Engineer. The project was designed to study various options to enhance reliability and availability of 230-kV system relaying and control equipment including its connections to 500-kV switchyard. A report was compiled to document pros and cons of options considered and conceptual design under various options (study and concept engineering).

Manitoba Hydro, Grounding System Analysis of Existing St. Laurent Station, Winnipeg, Manitoba, Canada, Senior Consultant. The project was designed to ensure that the existing grounding grid meets safety requirements. Manitoba Hydro provided soil resistivity and fall of potential measurements to perform the analysis using CDEGS software.

Manitoba Hydro, Study to Upgrade Dorsey Station Relay Building , Dorsey, Manitoba, Canada, Senior Consultant. The project was designed to improve the relay building reliability and availability under a credible worst internal event or external event. It also included preparing; conceptual layouts for 230-kV and 500-kV equipment to be included; modifications to 230-kV, 500-kV and HVdc protection and controls.

Manitoba Hydro, Silver Station Grounding Study, Winnipeg, manitoba, Canada, Senior Supervising Engineer. The study was designed to check adequacy of existing station grid. The work included review of the soil resistivity and fall of potential measurements; development of soil model based on the resistivity measurement; development of grounding system model; performance of fall of potential simulation to qualify soil model; performance of safety analysis; and identification of zone of influence around the substation.

Career History

2007 - Present	Hatch, Winnipeg, Manitoba, Canada. Staff Engineer
2003 - 2007	Teshmont Consultants LP, Canada. Senior Consultant, Supervising Engineer, Senior Supervising Engineer
2001 - 2003	Clestica Toronto, Toronto, Ontario, Canada. Production Assistant
1996 - 2001	Alfanar Company, Saudi Arabia. Lead Electrical Engineer
1993 - 1994	Water and Power Development Authority (WAPDA), Pakistan. Design Electrical Engineer
1992 - 1993	Descon Pakistan, Pakistan. I&C Design Engineer/Electrical Engineer

Technical Papers

Rauf Ahmed (Hatch), Kevin Phaneuf (Mosaic), Presentation to SaskPower Inspection on the M421 interpretation on the GPR transfer from surface facilities not covered in M421 and GFV and GPR tolerable limits., Presentation to Regulator for K2 M421 Compliance study, 2017

Rauf Ahmed and other WG B4.61 members, Technical Brochure B4.61 "General Guideline for HVDC Electrode Design, Contributed into Chapter 2" Shore Electrode" and Chapter 5 "Design Criteria"., 2017

Professional Development

IEC 61850 implementation Siemens Solution, 2017

SEL Training Certificate, IEC 61850 Training SEL Solution, 2015

PMP Certificate, PMP, 2006

CDEGS Training, 2005

Relaying and Control Application, 2000

Languages

English, German, Punjabi, Urdu

Donald Martin Jr., P.E.

Water Power Business Unit Lead - Amherst

Education

BASc, Aeronautical Engineering, State University of New York, Amherst, New York, United States, 1994

BASc, Mechanical Engineering, State University of New York , Amherst, New York, United States, 1994

Professional Affiliations

Registered Professional Engineer: New York, Alabama, California, Florida, Georgia, Kentucky, - Member

Registered Professional Engineer: Massachusetts, Maine, Minnesota, North Carolina, North Dakota, - Member

Registered Professional Engineer: New Hampshire, Pennsylvania, South Carolina, Tennessee, Vermont - Member

Summary of Experience

Donald is a Senior Mechanical Engineer and Manager with 26 years of experience in a wide variety of areas. He is currently the Water Power Business Unit lead in Hatch's Amherst NY office where his current responsibilities include Business Development, Project Management and Engineering Manager. His design and engineering experience has included industrial gas plants, machine design, structural design and hydroelectric power plants. He has significant experience in due diligence assessments of hydroelectric stations. He also has been responsible for commercial building systems, including plumbing, sanitary and HVAC systems. Donald also has extensive project engineering experience in the preparation of bid and construction documents, specifications, and drawings. His experience also includes strong computer skills, field work/condition assessment/due diligence, cost estimating, work process improvements, production supervision and field engineering.

He has experience with balance of plant mechanical systems for hydroelectric generating stations, modular piping and equipment skid designs, as well as finite element pipe stress analysis of cryogenic and high temperature piping. He has piping design experience with many different applications, including high pressure, slurries, oxygen, hydrogen, steam, water, air and other fluids. He has experience with dozens of technical assessments involving nearly 200 hydroelectric, wind and solar plants where his role has included Project Management, OPEX analysis, Capital Expenditure (CAPEX), cost estimating, planning and technical assessment of assets.

Relevant Experience

Water Power Business Unit Lead, Amherst Office. Business development and Office/Engineering manager for Hatch's Amherst NY office. Role includes:

- business development, including proposals
- client relationship management
- technical supervision of engineers and designers
- staff management including hiring, skills development and project assignments
- oversite of project management
- business development
- project management
- mechanical engineering

Various, Hydroelectric Facility Assessments, Various, Senior Mechanical Engineer. management engineering support for over 50 Hydroelectric facility assessments, including

- project management
- technical assessment of mechanical systems and equipment
- review and benchmarking of O&M costs
- capital expenditures planning
- replacement value and remaining value calculations
- work has included civil, structural, environmental, mechanical and electrical systems

Office and Engineering Manager. Office and Engineering manager for Hatch's Amherst NY office. Role included:

- technical supervision of engineers and designers
- staff management including hiring, skills development and project assignments
- oversite of project management
- business development
- project management
- mechanical engineering

Various, Small Projects, Various, Senior Mechanical Engineer. Senior Mechanical Engineer on a variety of small projects, including:

- balance of plant mechanical systems for hydroelectric stations
- analysis and design of various piping systems, including steam, generator exhaust and cryogenic lines
- HVAC design, including ventilation improvements to existing/new buildings and a chiller replacement

- plumbing design for retrofit and new buildings
- specification of fire protection systems
- energy studies, including HVAC equipment and hydroelectric turbines.
- replacement of two 10-foot diameter butterfly valves.
- turbine performance testing
- technical assessments of wind and solar projects

New York Power Authority, Controls Upgrade Study, Lewiston, NY, Senior Mechanical Engineer. Mechanical engineer for the condition assessment, modernization and life extension options of HVAC, governors, cooling water and various balance of plant mechanical systems

Energy Ottawa, Chaudiere Hydro Redevelopment, Ottawa, Ontario, Mechanical Engineer. Mechanical engineer of balance of plant systems and trashracks for redevelopment of a 29MW hydroelectric station.

Hatch-Mott McDonald (MWRA), Upgrades to Quabbin Aqueduct, New Braintree, MA, Mechanical Engineer. preliminary design of a 12-foot by 12-foot stainless steel vertical roller gate

Brookfield Renewable Power, Safe Harbor Due Diligence, Manor Township, PA, United States, Project Manager. Project Manager for due diligence assessment of a 422MW hydroelectric station on the Susquehanna River. Project included energy estimates, environmental investigation, condition assessment and capital expenditures planning

ZPC, Extension of Kariba Power Plant, Kariba, Zimbabwe, Senior Mechanical Engineer. owner's engineering support for development of mechanical balance of plant systems associated with a new underground powerhouse; role involved design review of 3rd party engineering documents

Nova Scotia Power, Roseway & Harmony Project Definition, Nova Scotia, Canada, Project Manager. Project manager for the project definition study and preliminary design of two small hydroelectric stations redevelopments, including energy estimates, 30% design drawings of civil, structural, mechanical and electrical as well as cost estimates

Rochester Gas & Electric, Station 5 Tunnel Access Hatch, Rochester, NY, Mechanical Engineer. design of a 7'-6" high by 2'-6" wide access hatch in a conical section that tapered from 14'foot diameter to 10-foot diameter over a 4-foot length.

City of Sitka, Blue Lake Hydroelectric Expansion, Sitka Alaska, United States, Mechancial Engineer. balance of plant mechanical design for the Blue Lake hydroelectric project expansion in Alaska, USA. The project raised the height of the dam by 83 feet and expands the plant capacity from 8 MW to 18 MW. Services included a Phase 1 design development study. Subsequent services are to include Phase 2A equipment bid documents, Phase 2B engineering, and Phase 3 construction support.

New York Power Authority, Niagara Ice Boom Storage Project, Buffalo, NY, United States, Mechanical Engineer. mechanical engineering for a warehouse/office building, including plumbing, HVAC, cranes, utilities and site infastructure

Ketchikan Public Utilities, Whitman Lake Hydroelectric Project, Ketchikan, AK, United States, Mechanical Engineer. mechanical engineering for balance of plant mechanical systems for a new hydroelectric station

NY State University Construction Fund, Power Plant – Upgrade Electrical Service, Install Generators in Various Buildings, Buffalo, NY, United States, Mechanical Engineer. mechanical engineering and field construction support to upgrade electrical service for a power plant building and add 3 natural gas generators inside of existing buildings

Rochester Gas & Electric, Station 2 New Unit Construction Support, Rochester, NY, United States, Mechanical Engineer. mechanical engineering for balance of plant mechanical systems for a new hydroelectric station

TransCanada Hydro, Vernon Units 5-8 Repowering, Vernon, VT, United States, Mechanical Engineer. mechanical engineering for balance of mechanical plant systems for retrofitting new units into a existing hydroelectric station

Dominion Transmission Inc., Storage Factory Project, Tioga County, PA, United States, Mechanical Engineer. assisted in preparing state and federal environmental permits associated with a natural gas storage facility

Alcoa, Various Projects, Massena, NY, United States, Mechanical Engineer. various studies and upgrade projects for an aluminum manufacturing operation, including analysis of cost savings opportunities for a plant steam system and options analysis for industrial waste water treatment projects

New York Office of Children and Family Services, Sewage Treatment Plant Replacement, Great Valley, NY, United States, Mechanical Engineer. wastewater treatment plant upgrade from feasibility studies through design, including evaluation of process options and review of new technology

Carbone of America, SO2 Remediation Project, St. Marys, PA, Mechanical Engineer. field/construction support and engineering for construction of two SO2 scrubbers

Western Regional Off Track Betting (WROTB), Batavia Downs Renovations, Batavia, NY, United States, Mechanical Engineer. new design and retrofit of plumbing and HVAC systems for a racing/gaming facility

Buffalo, NY, United States, Product Engineer. Mokon Division of Protective Closures Inc., Buffalo, New York, USA. Product Engineer. Product Engineer for the chiller product line. Responsibilities included:

- mechanical, electrical and instrumentation custom designs of a variety of refrigeration systems from 1/4 to 20 ton capacities
- monitoring of fabrication for the units in the production facility
- processing of improvements in parts tracking and management, including development of Microsoft Access database for searching parts catalogs, and database development linking Access directly with the IBM AS/400 system
- creating an engineering change process
- initiation of cost savings measures within the product line by proactively soliciting new vendors and/or evaluating new components
- management of project to obtain CE qualification for product lines to gain entry into the European market
- selecting consultants, setting schedules and agendas, conducting training, and interfacing with the engineering staff to resolve technical issues simultaneously on all product lines
- introducing ASME B31.3 and B31.5 standards for piping designs

Tonawanda, NY, United States, Project/Mechanical Engineer. Praxair Inc., Tonawanda, New York, USA. Project/Mechanical Engineer. Responsibilities included:

- functional design and engineering of piping systems to relevant codes (ASME, CGA, ANSI, AS
- design of modular piping and equipment skids
- performance of finite element analysis of piping systems, including compression equipment, steam and cryogenic systems
- high pressure piping design, including hydrogen pipeline compressor
- safety review of isolating a liquid hydrogen storage tank for repair while the remainder of the system remained in operation
- development and modification of design and engineering specifications, engineering guidelines, and computer programs
- development of technical specifications, ordering drawings and design construction packages for new plant construction and upgrades which included review and approval of supplier drawings and contract reviews
- root cause analysis and resolution of technical issues at operating plants
- Assistant Construction Manager for the on-site construction management activities, resolution of technical issues with contractors and negotiation of scope/contract changes with contractors
- specification, testing and qualification of vendor supplied equipment
- training in root cause analysis (RCA) and facilitating resolution of feedback into the design department's work process
- training other engineers, including review and approval of their work

Career History

2018 - Present	Hatch Associates Consultants Inc., Amherst, New York, United States. Water Power Business Unit Lead, Amherst Office
2017 - 2018	ATSI, Amherst, New York, United States. Principal Mechanical Engineer
2001 - 2017	Hatch Associates Consultants Inc., Amherst, New York, United States. Manager of Engineering, Amherst Office
2000 - 2001	Mokon Division of Protective Closures Inc., Buffalo, New York, United States. Product Engineer
1995 - 2000	Praxair Inc., Tonawanda, New York, United States. Project/Mechanical Engineer

Languages

English, German

Metropolitan Sewerage District of Buncombe County, North Carolina
CAPITAL IMPROVEMENT PROGRAM

BUDGET DATA SHEET - FY 2023 - 2024

PROJECT:	**Hydroelectric Power Plant Rehab**	**LOCATION:**	**MSD-Treatment Plant**
TYPE:	**Treatment Plant**	**PIPE RATING:**	**N/A**
PROJECT NO.	**2021016**	**TOTAL LF:**	**0**
PROJECT BUDGET:	**$1,340,000.00**	**PROJECT ORIGIN:**	**Aging Equipment, Condition**

DESCRIPTION	ESTIMATED PROJECT COST	TOTAL EXPENDS THRU 12/31/22	EST. COST JAN - JUNE 2023	BUDGET FY 23-24
55310 - PRELIM. ENGINEERING				
55320 - SURVEY - DESIGN				
55330 - DESIGN	$100,000.00			
55340 - PERMITS				
55350 - SPECIAL STUDIES	$200,000.00	$4,726.00		$195,274.00
55360 - EASEMENT PLATS				
55370 - LEGAL FEES				
55380 - ACQUISITION SERVICES				
55390 - COMPENSATION				
55400 - APPRAISAL				
55410 - CONDEMNATION				
55420 - CONSTRUCTION	$1,000,000.00			
55430 - CONST. CONTRACT ADM.	$40,000.00			
55440 - TESTING				
55450 - SURVEY - ASBUILT				
TOTAL AMOUNT	**$1,340,000.00**	**$4,726.00**	**$0.00**	**$195,274.00**

ENGINEER:	MSD	TH	
R.O.W. ACQUISITION:	MSD	**# PLATS: [0]**	
CONTRACTOR:			
CONSTRUCTION ADM.:	MSD		
INSPECTION:	MSD		

ESTIMATED BUDGETS - FY 25 - 33	
FY 24-25	$100,000.00
FY 25-26	$1,040,000.00
FY 26-27	$0.00
FY 27-28	$0.00
FY 28-29	$0.00
FY 29-30	$0.00
FY 30-31	$0.00
FY 31-32	$0.00
FY 32-33	$0.00

PROJECT DESCRIPTION: This project includes an evaluation of the existing hydroelectric plant and its aging infrastructure. The study will consider the cost benefit of replacing various components with more efficient technology. The project also includes rehabilitation of the influent bar screen structure.

SPECIAL PROJECT NOTES:

N
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S

Hydroelectric Power Plant Rehabilitation
Project No. 2021016

NOT TO SCALE

METROPOLITAN SEWERAGE DISTRICT
of
BUNCOMBE COUNTY, NORTH CAROLINA

Budget Map

Metropolitan Sewerage District of Buncombe County
BOARD ACTION ITEM

BOARD MEETING DATE: 5/17/23

SUBMITTED BY: Tom Hartye, P.E. - General Manager

PREPARED BY: Hunter Carson, P.E. - Director of Engineering
Darin Prosser, P.E. - Project Engineer

SUBJECT: Consideration of Engineering Services Contract – Biological Treatment Alternatives Evaluation, MSD Project Number 2016063

BACKGROUND: Wastewater biological treatment is a process that uses bacteria and other small organisms to break down organic waste present in sanitary sewerage. MSD's biological treatment process uses Rotating Biological Contactors (RBCs), a technology that was considered innovative at the time of installation in 1988 and allowed MSD's Water Reclamation Facility (WRF) to expand from 25mgd to 40mgd. The RBCs have performed well over the past 35 years, however, due to their age, condition, and obsolescence, as well as future regulatory requirements, the biological treatment process will be replaced with new technology capable of meeting ammonia-nitrogen limits and other anticipated nutrient limits.

The purpose of this project is to generate a Biological Treatment Alternatives Evaluation Preliminary Engineering Report (PER) that will evaluate and recommend improvements to the biological treatment process at MSD's WRF. The PER will include a phased plan for WRF upgrades necessary to meet future regulatory requirements of MSD's National Pollutant Discharge Elimination System (NPDES) permit. The near term objective is to meet the future ammonia-nitrogen limits on October 1, 2030, while the long term objective would be to design improvements with the potential to upgrade to more extensive Biological Nutrient Removal (BNR) if that should ever be required.

In 2015, MSD embarked on a series of major capital improvement projects (recommendations of the *WRF Facilities Plan Update,* HDR) to optimize the RBC system and create an appropriate foundation for the future biological treatment upgrade. These included the Plant Headworks Improvements project, the addition of High-Rate Primary Treatment, and replacement of failed RBCs. Improvements to the biological treatment process is the final and most significant recommendation from the Facilities Plan Update.

The PER will provide prioritized recommendations for significant capital projects related to the biological treatment improvements. The PER will include a selected technology, phasing recommendations and specific steps to be taken to achieve the ammonia limits, design and construction timelines, methods for maintaining plant operations during construction, and cost estimates. It will also evaluate ways to maximize the utilization of

existing plant processes both upstream and downstream of the biological treatment system.

Selection of Consultant

In accordance with NCGS 143-64.31 the District advertised a Request for Qualifications for the project, and received responses from Black & Veatch, Garver, Hazen & Sawyer, and HDR. Each firm was invited to interview in front of MSD's selection committee and discussed their qualifications and methodology for approaching this project. All firms possessed competent staff and gave excellent presentations.

After careful review and consideration of each firm's capabilities, experience, and staffing, the selection committee selected Hazen & Sawyer as the most qualified engineering consultant to complete the project. Hazen & Sawyer has extensive experience with similar biological treatment studies and an excellent understanding of the challenges this project presents for MSD's WRF.

Hazen & Sawyer was recently selected to complete MSD's Solids Handling PER (awarded March 15, 2023) and has performed well on past projects for the District, including the 2013 Maximum Available Control Technology (MACT) Compliance Plan for MSD's sewage sludge incinerator, and the 2011 Weaverville Pumping System Study.

Following the firm selection, Hazen & Sawyer prepared a Scope of Work which includes the following services:

- Evaluate characteristics of the wastewater influent and effluent and future flow and load projections.
- Age and condition evaluation of the existing biological treatment processes.
- Current and future capacity evaluation of existing biological treatment processes.
- Technology assessment for future biological treatment processes.
- Preliminary permitting for new biological treatment process.
- Preparation of a PER. The PER will include recommended infrastructure improvements, address constructability concerns and permitting requirements, and a schedule for implementation.

Engineering Fee

Hazen & Sawyer's initial fee was reduced to $512,952.00. Hazen & Sawyer's Scope of Services includes optional tasks totaling $92,136.00 for Site-Specific Sampling, and assistance with Alternative Project Delivery (Design-Build) contract documents.

The inclusion of these optional tasks is recommended by staff but will be initiated only if deemed necessary.

Please refer to the attached Scope of Services and Fee Schedule for further details.

FISCAL IMPACT: The proposed FY 23-24 budget for this project is $600,000.00.

This project will span two fiscal years, FY 23-24 and FY 24-25 so a Capital Project Ordinance is required.

STAFF RECOMMENDATION: Staff recommends the District enter into an engineering contract with Hazen & Sawyer in the amount of $512,952.00, subject to final review and approval by District Counsel.

BIOLOGICAL TREATMENT ALTERNATIVES EVALUATION
PRELIMINARY ENGINEERING REPORT
CAPITAL PROJECT ORDINANCE

BE IT ORDAINED by the Board of the Metropolitan Sewerage District of Buncombe County, North Carolina, that pursuant to Section 13.2 of Chapter 159 of the General Statutes of North Carolina, the following Biological Treatment Alternatives Evaluation Preliminary Engineering Report (PER) Capital Project Ordinance is hereby adopted:

Section 1. The project authorized is the Biological Treatment Alternatives Evaluations PER to be financed in whole or in part by appropriated net position.

Section 2. The following amounts are appropriated for the project:

Capital Expenditures **$ 512,952.00**

Section 3. The following revenues are anticipated to be available to provide for these expenditures:

Transfer from General Fund **$ 512,952.00**

Section 4. The Finance Officer is hereby directed to maintain within the Capital Improvements Program Fund sufficient specified detailed accounting records to satisfy all financial reporting requirements.

Section 5. Funds may be advanced from the Operations and Maintenance fund if necessary for the purpose of making payments as due.

Section 6. The Finance Officer is directed to include a detailed analysis of past and future costs and revenues on this capital project in every budget submission made to this Board.

Section 7. Copies of this Biological Treatment Alternatives Evaluation PER Contract Project Ordinance shall be furnished to the Secretary of the Governing Board, and to the Finance Officer for direction carrying out this project.

ADOPTED this seventeenth Day of May 2023.

ATTEST: **BOARD OF THE METROPOLITAN SEWERAGE DISTRICT OF BUNCOMBE COUNTY, NORTH CAROLINA**

M. Jerry VeHaun, Chairman

Jackie W. Bryson, Secretary/Treasurer

APPROVED AS TO FORM:

William Clarke, Legal Counsel
Metropolitan Sewerage District
of Buncombe County, NC

Scope of Services

Metropolitan Sewerage District of Buncombe County
French Broad River Water Reclamation Facility
Biological Treatment Alternatives Evaluation

The purpose of this agreement is for Hazen and Sawyer (Hazen) to provide Professional Engineering services to complete a Biological Treatment Alternatives Evaluation at Metropolitan Sewerage District of Buncombe County's (MSD) French Broad River WRF as described in the Request for Qualifications (RFQ). The evaluation will include development of technical memoranda (TMs) to be consolidated in a preliminary engineering report (PER) that will be submitted to the North Carolina Division of Environmental Quality (NDDEQ). The evaluation will include preliminary design and planning-level cost estimates to be incorporated into MSD's Capital Improvement Program (CIP).

The following tasks summarize the scope of work and are further detailed herein:

- Task 1 – Kickoff Meeting and Progress Meetings
- Task 2 – Preliminary Evaluations
- Task 3 – Biological Process Alternatives Development
- Task 4 – Permitting Assistance
- Task 5 – Proposed Alternative Concept Development
- Task 6 – CIP Development and Final Report
- Task 7 – Optional Services

Hazen will manage the efforts of its project team members, assign manpower, delegate responsibilities, review work progress, monitor budget and schedule, and direct the progress of the work. As part of project administration, Hazen will provide monthly invoicing with status reports and schedule updates pertaining to the Work.

The scope of tasks outlined below shall include all incidentals required to provide the complete task described, including but not limited to overall management of the evaluation work, project planning, budget and schedule oversight, administration of the MSD agreement, arrangement / management of all meetings and communication as needed with various project stakeholders.

1. Kickoff Meeting and Progress Meetings

1.1 Kickoff Meeting

Hazen will lead a project kickoff workshop with MSD. The purpose of the workshop is to reintroduce the key Hazen team members, review the scope of services as delineated herein, discuss MSD's priorities and drivers, understand current plant process management and operations, and to obtain critical process and operating data. Hazen to develop meeting minutes.

1.2 Progress Meetings

Hazen will host virtual progress meetings via Teams with MSD staff as necessary. At a maximum, Hazen will conduct progress meetings every 2 months in addition to the workshops listed below. These meetings will be conducted in between workshops to provide a project update to MSD, if desired. Progress meetings and workshops may be coordinated with the Solids Handling Study as opportunities are available and to the extent neither project schedules are adversely affected. Hazen to develop meeting minutes.

[Project workshops are detailed in other sections of this scope of services in the individual tasks.]

2. Preliminary Evaluations

2.1 Influent Wastewater Characterization

Hazen will evaluate historical plant operating data to estimate influent wastewater flow rates, characteristics, and associated peaking factors. Operating data from the facility shall be provided in electronic format (e.g., Microsoft Excel spreadsheet, raw database files) for the previous three (3) years for the following criteria:

- Influent and effluent monthly monitoring report forms
- Influent wastewater parameters including flow, temperature, pH, COD, BOD, TKN, NH_3-N, TP, and TSS
- Available operating data.
- High-Rate Primary Treatment (HRPT) effluent data (as available)

Hazen will utilize information provided to develop influent wastewater average, maximum month, and maximum day concentrations and loadings, and to develop flow peaking factors for maximum month and peak hour. We will coordinate the data request with the Solids Handling Evaluation request to minimize impacts on MSD staff.

2.2 Flow and Load Projections

Hazen will develop influent design criteria using (a) data from Task 2.1, and (b) flow and load projections scoped to be developed as part of the Solids Handling PER.

[Note: Flow and load projections and solids projections shall consider HRPT performance.]

2.3 Condition Assessment

A visual mechanical condition assessment of the existing liquid train processes (equipment) and supporting infrastructure will be performed to identify visible condition and any perceived defects or deficiencies. In addition to the visual condition assessment, staff interviews will be conducted and maintenance records reviewed. The assessment will cover the following equipment and infrastructure:

- Rotating Biological Contactors (RBCs), including viability of relocating units
- Aeration Blowers, including viability of remaining in service for a phased construction plan
- Intermediate Pumps
- Secondary Clarifiers and Supporting Equipment
- Cloth Disk Filters
- Chlorine Contact Tanks and Supporting Equipment
- Supporting Mechanical Equipment (e.g. Slide Gates, Major Valves)
- Concrete Structures
- Plant Electrical Service (utility service, main switchgear, standby power, and distribution service in plant), including capacity allowance for new equipment, service life and long-term viability review, and code considerations

Mechanical / Equipment assessment will be based on review with plant personnel to document operating and maintenance history to identify items clearly in need of upgrade or replacement for long term viability. Condition and any perceived defects or deficiencies will be documented.

2.4 Capacity Assessment

Capacity assessment of the liquid train processes will be developed including each set of RBCs, blowers, pumps, filters, and chlorine contact. Ways to optimize the existing system to increase capacity, reliability and longevity will be evaluated, specifically as it may relate to any phased approach to proposed plant upgrades.

Hazen will develop an uncalibrated process model to validate plant performance with the existing RBCs including utilization of available plant influent and operations data. Site-specific sampling will be performed as a separate task for the purpose of improving model validation, if directed by MSD.

Electrical capacity assessment will be developed specifically as it relates to proposed plant process facilities and associated plant distribution power and unit substations and/or transformers.

2.5 Development of Site Constraints

Hazen will develop site constraints that will apply to each process alternative including:

- Evaluate available site space for facilities and potential space within existing basins; including coordination with facilities identified in the Solids Handling PER.
- Evaluate optimization of RBC units with any unit relocation.
- Document the expected/required performance of the HRPT process to be applied to secondary process alternatives. Evaluate optimization and best use of HRPT process in coordination with secondary process alternatives.
- Develop preliminary layout of UV disinfection facilities and piping.
- Develop maintenance of plant operations during construction (MOPO) constraints that apply to any alternative to ensure plant effluent quality to meet the current NPDES permit ammonia limit; including preliminary scoping of temporary provisions that apply to specific RBC basins (e.g. pumping of RBC #2 effluent to secondary clarifiers, bypass piping from RBC #1 to RBC #3, bypass piping from preliminary treatment effluent / HRPT facilities to RBC #2)

2.6 Process Alternatives Screening

Hazen understands that the following process alternatives have been proposed for consideration:

- Densified Activated Sludge (DAS)
- Aerobic Granular Sludge (AGS)
- Moving Bed Biofilm Reactor (MBBR)
- Biological Aerated Filter (BAF)
- Membrane Aerated Biofilm Reactor (MABR)
- Integrated Fixed-Film Activated Sludge (IFAS)

Preliminary screening will be performed to develop high-level benefits and challenges to short-list to four process alternatives for detailed evaluation in Task 3. Per Hazen's initial assessment of process viability, it is anticipated that DAS, AGS, and MBBR will be included for detailed evaluation along with a fourth most viable alternative from the remaining options. However, the final four alternatives will be confirmed with MSD during review of Task 2.

2.7 Technical Memorandum and Workshop

Hazen will prepare a draft TM (#1) summarizing the findings and recommendations of the evaluations and assessments in Task 2. The draft TM will be submitted to MSD for review prior to the Workshop. Following sufficient review time, a half-day workshop will be conducted to present the draft TM and to receive comments. A PowerPoint presentation will be developed to facilitate review and discussion. Review comments will be incorporated into final TM #1 following the workshop.

3. Biological Process Alternatives Development

3.1 Biological Process Alternatives

Hazen will utilize common parameters summarized in Task 2 to evaluate biological process alternatives, including:

- Densified Activated Sludge (DAS), assuming short-listed
- Aerobic Granular Sludge (AGS), assuming short-listed
- Moving Bed Biofilm Reactor (MBBR), assuming short-listed
- Process Alternative #4

Hazen will utilize the uncalibrated process model to assess non-proprietary process alternatives (e.g. DAS). Hazen will utilize manufacturer input to assess the proprietary process alternatives (e.g. AGS, MBBR, BAF). A process information package will be developed to enlist comparable proposals from manufacturers of proprietary processes.

Hazen will develop hydraulic profile, process schematic, and electrical demand and distribution basis evaluations to be applied to and detailed with each process alternative.

- Hydraulic profile basis will be developed based on existing constraints (e.g. RBC basin depths) and will be utilized to identify any apparent benefits to considering additional excavation to increase process tank / reactor depths. Hydraulic profile will include any intermediate pumping requirements (permanent and temporary), with the goal of ultimately omitting this requirement in the final phase.
- Process schematic basis will be developed including phasing options. The process diagram will include any modulating valves and/or pumps required to operate parallel processes (temporary during construction and/or permanent upon completion of construction).
- Plant site electrical demand and distribution single-line diagram will be developed to identify major load centers and load requirements.

3.2 DAS Evaluation and Technical Memorandum Development

Hazen will evaluate DAS including the following components:

- Refine hydraulic profile basis for DAS.
- Refine process schematic for DAS.
- Refine plant site electrical demand and distribution single-line diagram for DAS.
- Solids production estimate of volume and concentration ranges.
- MOPO / phasing strategy and alternatives.
- Cost estimate, including phasing considerations applicable to MSD's CIP.
- Operations and maintenance benefits and challenges.
- Operating cost estimate, including electrical power demand.
- Construction and commissioning schedule.
- Effluent quality for near-term and long-term effluent limits.

Hazen will prepare a draft TM (#2A) summarizing the findings and recommendations of the evaluations and assessments for DAS. The draft TM will be submitted to MSD for review prior to the Workshop.

3.3 AGS Evaluation and Technical Memorandum Development

Hazen will evaluate AGS including all items listed in Task 3.2.

Hazen will prepare a draft TM (#2B) summarizing the findings and recommendations of the evaluations and assessments for AGS. The draft TM will be submitted to MSD for review prior to the Workshop.

3.4 MBBR Evaluation and Technical Memorandum Development

Hazen will evaluate MBBR including all items listed in Task 3.2.

Hazen will prepare a draft TM (#2C) summarizing the findings and recommendations of the evaluations and assessments for MBBR. The draft TM will be submitted to MSD for review prior to the Workshop.

3.5 Alternative #4 Evaluation and Technical Memorandum Development

Hazen will evaluate process alternative #4 including all items listed in Task 3.2.

Hazen will prepare a draft TM (#2D) summarizing the findings and recommendations of the evaluations and assessments for alternative #4. The draft TM will be submitted to MSD for review prior to the Workshop.

3.6 Conduct Workshops

Following sufficient review time of the TMs, two half-day workshop will be conducted to present the draft TMs and to receive comments. A PowerPoint presentation will be developed to facilitate review and discussion. Review comments will be incorporated into final TMs following the workshop.

It is anticipated that upon completion of the process evaluation workshops the selected alternative will be identified.

4. Permitting Assistance

4.1 Meetings with NCDEQ

Hazen will coordinate meetings with the NC Division of Environmental Quality (NCDEQ) to review process alternatives to summarize the alternatives evaluated, present the recommended alternative, discuss current and potential/future regulatory limits, and clarify/summarize steps necessary to secure an Authorization to Construct (ATC) permit.

Two virtual meetings are anticipated.

5. Proposed Alternative Concept Development

5.1 Proposed Alternative Concept Development

Hazen will develop the following conceptual design documents for the selected alternative, based on both initial CIP and future buildout:

- Preliminary General / Civil / Yard Piping Drawings (Estimated 10 Drawings)
- Preliminary Mechanical Drawings (Estimated 30 Drawings)
- Preliminary Electrical Drawings (Estimated 10 Drawings)
- Class 5 Level Capital Cost Estimate

5.2 Technical Memorandum and Workshop

Hazen will prepare a draft TM (#3) summarizing assumptions and content to support the 30% design documents. The draft TM will be submitted to MSD for review prior to the Workshop. Following sufficient review time, a half-day workshop will be conducted to present the draft TM and to receive comments. A PowerPoint presentation will be developed to facilitate review and discussion. Review comments will be incorporated into final TM #4 and preliminary drawings following the workshop.

6. CIP Development and Final Report

Hazen will summarize the final recommendation and cost for CIP budgeting purposes. Hazen will prepare an Executive Summary detailing the findings, conclusions, and recommendations for subsequent actions of the TMs. The Executive Summary and Final Report will include the selected alternative along with a design and construction timeline and specific steps to be taken to achieve the ammonia-nitrogen limits. The Final Report will include a summary of discussions with NCDEQ to document current and potential/future regulatory limits and necessary steps to obtain an ATC permit. In addition, Hazen will summarize the final recommendation and associated cost and present for CIP budgeting purposes by July 2024.

A draft of the Executive Summary will be submitted to MSD for review and comment prior to inclusion in the Final Report. Following sufficient review time, a half-day workshop will be conducted to present the draft Final Report and to receive review comments. A PowerPoint presentation will be developed to facilitate review and discussion. A final report will be prepared after the finalized Executive Summary and will include the Executive Summary and the four TMs. The final report will include four (4) bound copies and one (1) electronic version in bookmarked PDF format and delivered by September 2024.

7. Optional Services

7.1 Site-Specific Sampling

Hazen will provide site-specific sampling services, if needed and directed by MSD. Services include up to two independent weeks of sampling, expected to include three people per week. Sampling would provide for influent wastewater characterization to determine relevant chemical oxygen demand (COD) fractions (soluble vs. colloidal vs. particulate, biodegradable vs nonbiodegradable) for refinement of the process alternatives.

7.2 Process Piloting

Hazen will provide process piloting services, if needed and directed by MSD. Services include one site visit per week (one person at 8 hours per visit, including round-trip travel with no overnight lodging) over a 6-month period and coordination with manufacturers or vendors. Cost of pilot equipment rental, set up, operation, and monitoring will be independently funded and/or contracted by MSD. Scope and fee will be established upon direction from MSD, and no time is included in this scope.

7.3 Project Delivery Methods Assistance

Project Delivery Workshop:

Hazen will lead a workshop with MSD to review project delivery methods. During this workshop, Hazen and MSD will discuss available and/or desired outside funding sources for the project to determine if outside funding sources dictate the available delivery method(s). One meeting is anticipated.

Assist with Draft Alternative Delivery Agreement:

There are several standard agreements utilized in the water industry. Based upon experience, Hazen recommends that MSD consider one of the following standard agreements.

- ConsensusDocs
- DBIA
- EJCDC

Hazen will furnish MSD standard agreements from each entity. Upon sufficient review time by MSD, a workshop will be held to discuss the pros and cons of each so as to select the agreement that will protect the best interests of the project. Following the workshop, Hazen will provide recommended modifications to the selected standard agreement (if any).

[It is noted that this scope does not include any meetings with MSD's legal counsel to further refine the standard agreement language which will be required to finalize an RFQ solicitation package.]

List of Deliverables

- TM #1 – Preliminary Evaluations
- TM #2A – DAS Process Alternative
- TM #2B – AGS Process Alternative
- TM #2C – MBBR Process Alternative
- TM #2D –Process Alternative #4
- TM #3 – Proposed Alternative Concept (with Drawings)
- Final Report (Executive Summary + TMs + Drawings)
- Draft Alternative Delivery Agreement

Basis of Compensation

The work to be performed for providing professional engineering services associated with preparation of the Biological Treatment Alternatives Evaluation and PER as previously delineated in Scope of Services above, will be billed based on the Lump Sum Total of **$512,952**. The Project Total of **$605,088** includes the Lump Sum Total plus optional services under Task 7.

A breakdown of the fee is shown in the table below.

Task	Subtask Description	Total
1	Kickoff Meeting and Progress Meetings	$22,382
2	Preliminary Evaluations	$95,730
3	Biological Process Alternatives Development	$222,386
4	Permitting Assistance	$7,920
5	Proposed Alternative Concept Development	$132,972
6	CIP Development and Final Report	$31,562
	Lump Sum Total	**$512,952**
7	Optional Services	$92,136
	Project Total	**$605,088**

Our categorical billing rates are provided below. These rates will be used for any work authorized by MSD under Task 7 – Optional Services.

Employee Classification	Billing Rates
Vice President	$280.00
Associate Vice President	$260.00
Senior Associate	$245.00
Associate	$195.00
Senior Principal Engineer	$180.00
Principal Engineer	$160.00
Engineer	$130.00
Assistant Engineer	$120.00
Senior Principal Designer	$160.00
Principal Designer	$135.00
Designer	$105.00
Administrative	$80.00

Schedule

The schedule below summarizes the tentative major milestones for completion of the Biological Treatment Alternatives Evaluation:

Milestone Description	Tentative Date
NTP / Kick-Off Workshop	July 2023
TM #1 Workshop: Preliminary Evaluations	Oct 2023
TM #2A and #2B Workshop: DAS and AGS Alternatives	Feb 2024
TM #2C and #2D Workshop: MBBR Alternative and Process Alternative #4	May 2024
TM #3 Workshop: Proposed Alternative Concept Review	Aug 2024
CIP and Final Report Workshop: Draft Final Report Review	Sep 2024
Final Report Delivered	Sep 2024

Metropolitan Sewerage District of Buncombe County
French Broad River Water Reclamation Facility
Biological Treatment Alternatives Evaluation
Preliminary Engineering Services
Projected Manhours and Associated Fee

Task No.	Description	VP (Hrs) $280.00 Prj Dir Struve	AVP (Hrs) $260.00 Prj Mgr Parker	VP (Hrs) $280.00 Tech Advisor Pitt	AVP (Hrs) $260.00 Tech Advisor Babson	VP (Hrs) $280.00 Process Rohrbacher	VP (Hrs) $280.00 Innovation Latimer	AVP (Hrs) $260.00 Operations Lynch	Sr Assoc (Hrs) $245.00 Constructab Moretz	Sr Assoc (Hrs) $245.00 Cost Jesse	Sr Assoc (Hrs) $245.00 Structural Whiteley	Sr Prin Eng (Hrs) $180.00 Structural Connor	Assoc (Hrs) $195.00 Engineering Tommerdahl	Principal Eng (Hrs) $160.00 Engineering Ford	Principal Eng (Hrs) $160.00 Engineering Bennett	Engineer (Hrs) $130.00 Engineering Wood	Sr Prin Eng (Hrs) $180.00 Electrical Eval Siebach	Assoc (Hrs) $195.00 I&C Alcorn	Sr Pri CAD (Hrs) $160.00 Designer	Total Labor Hrs	Total Labor Fee
1	**Kickoff Meeting and Progress Meetings**																				
1.1	Kickoff Meeting (Hybrid)	8	8	2	8	8	2							2	8					46	$11,360
1.2	Progress Meetings (Virtual)	8	8			8								8	16					48	$10,400
	Subtotal	16	16	2	8	16	2	0	0	0	0	0	0	10	24	0	0	0	0	94	$21,760
	Task No. 1 Expenses																				
	Mileage for Meeting	1 Meeting at 950 Miles per Trip (250 from Charlotte, 350 from Charleston, 350 from Greensboro)																			$622
	Subtotal	Travel Expenses																			$622
	Task 1 Subtotal																				**$22,382**
2	**Preliminary Evaluations**																				
2.1	Influent Wastewater Characterization					2								16						18	$3,120
2.2	Flow and Load Projections		2			2								8						12	$2,360
2.3	Perform Visual Mechanical Condition Assessment		8												8	8				24	$4,400
2.3	Perform Structural Condition Assessment										8	8								16	$3,400
2.3	Perform Electrical Condition Assessment																8	8		16	$3,000
2.4	Capacity Assessment		4			2								8	16					30	$5,440
2.4	Uncalibrated BioWin Model Development					2								24						26	$4,400
2.4	Preliminary Electrical Assessment		2														8			10	$1,960
2.5	Evaluate Site		8			2			4						24		2			40	$7,820
2.5	Evaluate RBC Relocation / Optimization		2												8					10	$1,800
2.5	Document Expected/Required HRPT Performance					4	4													8	$2,240
2.5	UV Disinfection Preliminary Layout		8								4		24				4			40	$8,460
2.5	MOPO Constraints Development		4						8						40		4			56	$10,120
2.6	Process Alternatives Screening		4			24	16							16						60	$14,800
2.7	Prepare Tech Memo #1		4			4					2			8	32		2	2		54	$9,800
2.7	Tech Memo #1 Review / QAQC	2		2	2				2											8	$2,130
2.7	Conduct Workshop (Hybrid)	8	8		2	8					2			2	8		2			40	$9,530
	Subtotal	10	54	2	4	50	20	0	14	0	16	8	24	82	136	8	30	10	0	468	$94,780
	Task No. 2 Expenses																				
	Mileage for Site Visits	1 Site Visit at 600 Miles per Trip (250 from Charlotte, 350 from Charleston); 1 Site Visit at 250 Miles per Trip (250 from Charlotte)																			$557
	Mileage for Meeting	1 Meeting at 600 Miles per Trip (250 from Charlotte, 350 from Charleston)																			$393
	Subtotal	Travel Expenses																			$950
	Task 2 Subtotal																				**$95,730**
3	**Biological Process Alternatives Development**																				
3.1	BioWin Model Application					4								24						28	$4,960
3.1	Proprietary Process Information Package		8			8	4							16	24					60	$11,840
3.1	Hydraulic Profile Basis Evaluation		2												8	16				26	$3,880
3.1	Process Schematic Basis Evaluation		2												4					6	$1,160
3.1	Electrical Demand and Distribution Basis Evaluation		2														4			6	$1,240
3.2	DAS Evaluation and TM #2A Development																				
3.2	Hydraulic Profile		1												4	4				9	$1,420
3.2	Process Schematic		1												4					5	$900
3.2	Electrical Demand and Distribution		1														4			5	$980
3.2	Solids Production Estimate					4														4	$1,120
3.2	MOPO / Phasing Plan and Strategy		8			2	2	2	2						8		2			26	$5,850
3.2	Cost Estimate		2						2	16					8		2			30	$6,570
3.2	O&M Benefits and Challenges		2			2		2							8					14	$2,880
3.2	Operating Cost		2												4		2			8	$1,520
3.2	Construction / Commissioning Schedule		2			2			4						8		2			18	$3,700
3.2	Summarize Process Effluent Quality					2								2						4	$880
3.2	Prepare Tech Memo #2A		8			8								16	60		2	2		96	$17,230
3.2	Tech Memo #2A Review / QAQC	2		2	2															6	$1,640
3.3	AGS Evaluation and TM #2B Development	2	27	2	2	20	2	4	8	16	0	0	0	18	104	4	14	2	0	225	$44,690
3.4	MBBR Evaluation and TM #2C Development	2	27	2	2	20	2	4	8	16	0	0	0	18	104	4	14	2	0	225	$44,690
3.5	"Alternative #4" Evaluation and TM #2D Development	2	27	2	2	20	2	4	8	16	0	0	0	18	104	4	14	2	0	225	$44,690
3.6	Conduct Workshops (Hybrid, Two Total)	16	20			16	4							4	24					84	$19,760
	Subtotal	24	142	8	8	108	16	16	32	64	0	0	0	116	476	32	60	8	0	1,110	$221,600
	Task No. 3 Expenses																				
	Mileage for Meetings	2 Meetings at 600 Miles per Trip (250 from Charlotte, 350 from Charleston)																			$786
	Subtotal	Travel Expenses																			$786
	Task 3 Subtotal																				**$222,386**

Task No.	Description	VP (Hrs) $280.00 Prj Dir Struve	AVP (Hrs) $260.00 Prj Mgr Parker	VP (Hrs) $280.00 Tech Advisor Pitt	AVP (Hrs) $260.00 Tech Advisor Babson	VP (Hrs) $280.00 Process Rohrbacher	VP (Hrs) $280.00 Innovation Latimer	AVP (Hrs) $260.00 Operations Lynch	Sr Assoc (Hrs) $245.00 Constructab Moretz	Sr Assoc (Hrs) $245.00 Cost Jesse	Sr Assoc (Hrs) $245.00 Structural Whiteley	Sr Prin Eng (Hrs) $180.00 Structural Connor	Assoc (Hrs) $195.00 Engineering Tommerdahl	Principal Eng (Hrs) $160.00 Engineering Ford	Principal Eng (Hrs) $160.00 Engineering Bennett	Engineer (Hrs) $130.00 Engineering Wood	Sr Prin Eng (Hrs) $180.00 Electrical Eval Siebach	Assoc (Hrs) $195.00 I&C Alcorn	Sr Pri CAD (Hrs) $160.00 Designer	Total Labor Hrs	Total Labor Fee
4	**Permitting Assistance**																				
4.2	Prepare PPTs for Meetings	2	4			4								8						18	$4,000
4.1	Meetings with NCDEQ (Virtual)	4	4			4								4						16	$3,920
	Subtotal	6	8	0	0	8	0	0	0	0	0	0	0	12	0	0	0	0	0	34	$7,920
	Task No. 4 Expenses																				
	Mileage for Meetings	N/A																			$0
	Subtotal	Travel Expenses																			$0
	Task 4 Subtotal																				**$7,920**
5	**Proposed Alternative Concept Development**																				
5.1	Preliminary General / Civil / Yard Piping Drawings (10)		8												8	32			120	168	$26,720
5.1	Preliminary Mechanical Drawings (30)		16												40	40			240	336	$54,160
5.1	Preliminary Electrical Drawings (10)		2														32	8	120	162	$27,040
5.1	Class 5 Level Capital Cost Estimate		2							4					8					14	$2,780
5.2	Prepare Tech Memo #3		4			4								8	24		2	2		44	$8,030
5.2	Tech Memo #3 Review / QAQC	2		2	2		2		2											10	$2,690
5.2	Conduct Workshop (Hybrid)	8	10	2		8	2		2					2	12					46	$10,930
	Subtotal	10	42	4	2	12	4	0	4	4	0	0	0	10	92	72	34	10	480	780	$132,350
	Task No. 5 Expenses																				
	Mileage for Meeting	1 Meeting at 950 Miles per Trip (250 from Charlotte, 350 from Charleston, 350 from Greensboro)																			$622
	Subtotal	Travel Expenses																			$622
	Task 5 Subtotal																				**$132,972**
6	**CIP Development and Final Report**																				
	Summarize Recommendations for CIP Budgeting		4			4				4				16	16		2	2		48	$9,010
	Prepare Executive Summary		4			4								8	32					48	$8,560
	Provide Executive Summary Review	2		2	2		2													8	$2,200
	Conduct Final Report Review Workshop (Hybrid)	8	8	2	2	8	2	2	2					2	8		2			46	$11,170
	Subtotal	10	16	4	4	16	4	2	2	4	0	0	0	26	56	0	4	2	0	150	$30,940
	Task No. 6 Expenses																				
	Mileage for Meeting	1 Meeting at 950 Miles per Trip (250 from Charlotte, 350 from Charleston, 350 from Greensboro)																			$622
	Subtotal	Travel Expenses																			$622
	Task 6 Subtotal																				**$31,562**
	Total Base Lump Sum Fee	**76**	**278**	**20**	**26**	**210**	**46**	**18**	**52**	**72**	**16**	**8**	**24**	**256**	**784**	**112**	**128**	**30**	**480**	**2,636**	**$512,952**
7	**Optional Services**																				
7.1	Site Specific Sampling													80	80	80				240	$36,000
7.2	Process Piloting																			0	$0
7.3	Project Delivery Workshop (including PPT prep)	8	8		8				12							16				52	$11,420
7.3	Assist with Draft Alternative Delivery Agreement	32	12		36				48							16				144	$35,280
	Subtotal	40	20	0	44	0	0	0	60	0	0	0	0	80	80	112	0	0	0	436	$82,700
	Task No. 7 Expenses																				
	Mileage	2 Site Visits at 1,150 Miles per Trip (250 from Charlotte, 900 from Virginia Beach)																			$1,507
	Lodging	3 People / 8 Nights																			$6,750
	Mileage for Alternative Delivery Meetings	3 Meetings at 600 Miles per Trip (250 from Charlotte, 350 from Greensboro)																			$1,179
	Subtotal	Travel Expenses																			$9,436
	Task 7 Subtotal																				**$92,136**
	GRAND TOTAL	**116**	**298**	**20**	**70**	**210**	**46**	**18**	**112**	**72**	**16**	**8**	**24**	**336**	**864**	**224**	**128**	**30**	**480**	**3,072**	**$605,088**

Metropolitan Sewerage District of Buncombe County, North Carolina

CAPITAL IMPROVEMENT PROGRAM

BUDGET DATA SHEET - FY 2023 - 2024

PROJECT:	**Biological Treatment**	**LOCATION:**	**MSD-Treatment Plant**
TYPE:	**Treatment Plant**	**PIPE RATING:**	**N/A**
PROJECT NO.	**2016063**	**TOTAL LF:**	**0**
PROJECT BUDGET:	**$90,660,000.00**	**PROJECT ORIGIN:**	**Future Regulatory Requirements**

DESCRIPTION	ESTIMATED PROJECT COST	TOTAL EXPENDS THRU 12/31/22	EST. COST JAN - JUNE 2023	BUDGET FY 23-24
55310 - PRELIM. ENGINEERING	$725,000.00		$125,000.00	$600,000.00
55320 - SURVEY - DESIGN	$25,000.00			
55330 - DESIGN	$6,500,000.00			
55340 - PERMITS	$130,000.00			
55350 - SPECIAL STUDIES				
55360 - EASEMENT PLATS				
55370 - LEGAL FEES				
55380 - ACQUISITION SERVICES				
55390 - COMPENSATION				
55400 - APPRAISAL				
55410 - CONDEMNATION				
55420 - CONSTRUCTION	$80,000,000.00			
55430 - CONST. CONTRACT ADM.	$3,200,000.00			
55440 - TESTING	$80,000.00			
55450 - SURVEY - ASBUILT				
TOTAL AMOUNT	**$90,660,000.00**	**$0.00**	**$125,000.00**	**$600,000.00**

ENGINEER:	MSD	HC	
R.O.W. ACQUISITION:		**# PLATS: [0]**	
CONTRACTOR:	MSD		
CONSTRUCTION ADM.:	MSD		
INSPECTION:	MSD		

ESTIMATED BUDGETS - FY 25 - 33	
FY 24-25	$1,025,000.00
FY 25-26	$3,000,000.00
FY 26-27	$2,630,000.00
FY 27-28	$15,770,000.00
FY 28-29	$36,486,000.00
FY 29-30	$31,024,000.00
FY 30-31	$0.00
FY 31-32	$0.00
FY 32-33	$0.00

PROJECT DESCRIPTION: This project is the final and most significant recommendation from the Plant Facilities Plan. It will replace the Rotating Biological Contactors (RBC's) with an alternative biological treatment technology. This project will be driven by regulatory requirements.

SPECIAL PROJECT NOTES:

N
W E
S

Biological Treatment
Project No. 2016063

NOT TO SCALE

METROPOLITAN SEWERAGE DISTRICT
of
BUNCOMBE COUNTY, NORTH CAROLINA

Budget Map

Metropolitan Sewerage District of Buncombe County

Board Action Item

BOARD MEETING DATE: May 17, 2023

SUBMITTED BY: Tom Hartye, P.E. - General Manager

REVIEWED BY: Hunter Carson, P.E. - Engineering Director

PREPARED BY: Kevin Johnson, P.E. - Planning and Development Manager

SUBJECT: Acceptance of Developer Constructed Sewer System for the Terraces at Reynolds Mountain Phase 4 Sewer Extension, MSD Project No. 2020167

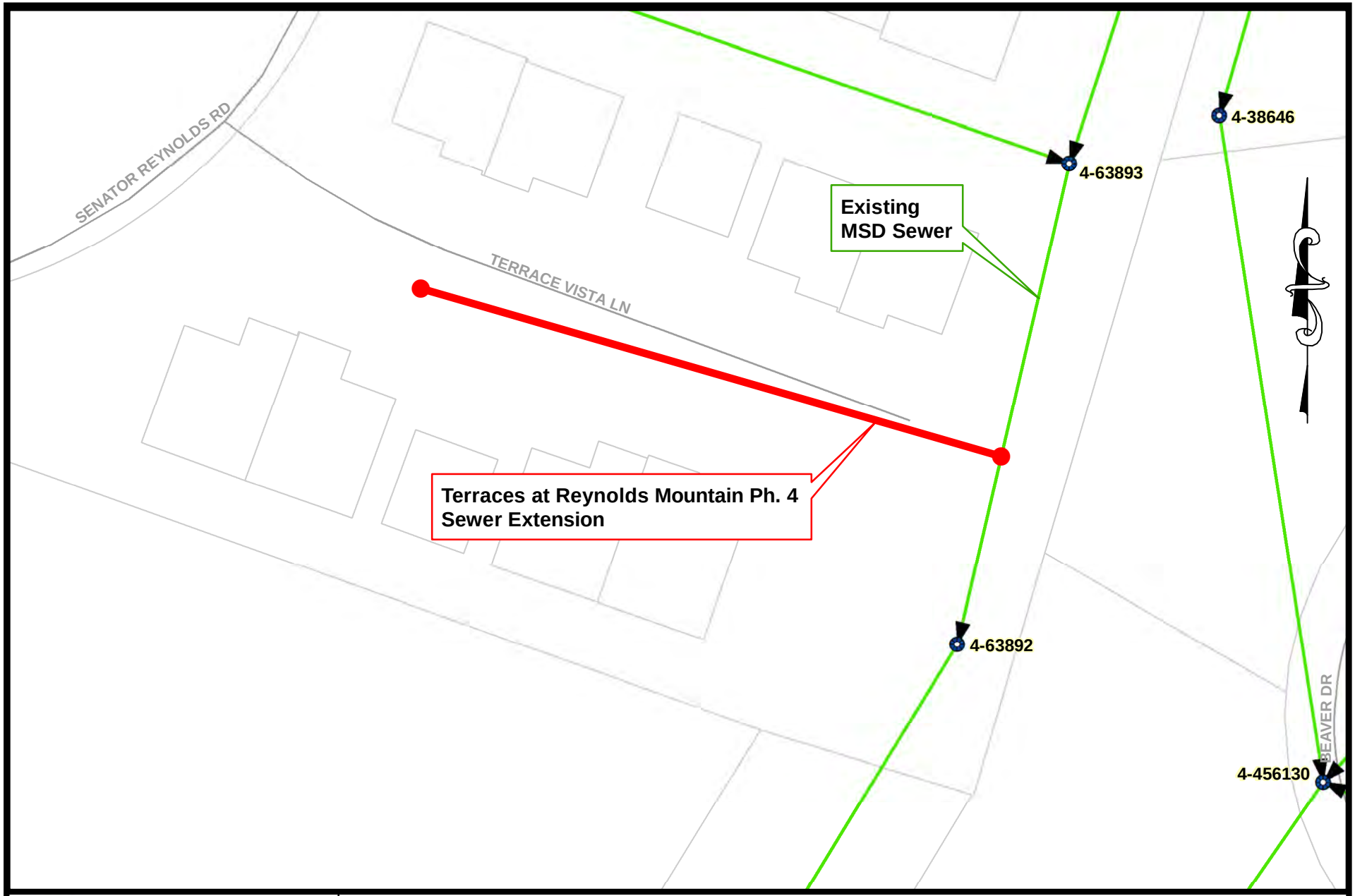
BACKGROUND: This project is located inside the District boundary off Senator Reynolds Road in the Town of Woodfin. The developer of the project is Bryan Sinclair of Skyfin Developers.

The project included extending approximately 165 linear feet of 8-inch public gravity sewer to serve the Single-Family Residential Development.

A wastewater allocation was issued in the amount of 3,000 GPD for the ten (10) townhomes in this phase of the residential development. The estimated cost of the sewer construction is $50,000.00.

All MSD requirements have been met.

STAFF RECOMMENDATION: Staff recommends acceptance of this developer constructed sewer system.



MSD
Engineering Division

Terraces at Reynolds Mountain Ph. 4 Sewer Extension
MSD Project # 2020167

Metropolitan Sewerage District of Buncombe County

05/03/2023

METROPOLITAN SEWERAGE DISTRICT OF BUNCOMBE COUNTY
BOARD ACTION ITEM

Meeting Date: May 17, 2023

Submitted By: Thomas E. Hartye, PE., General Manager

Prepared By: W. Scott Powell, CLGFO, Director of Finance

Reviewed By: Billy Clarke, District Counsel

Subject: Consideration of Auditing Services Contract for FY2023

Background

The external auditor is charged with providing an opinion on the District's financial statements prepared by management. The opinion is subject to governmental auditing standards issued by the Comptroller General of the United States. Additionally, the external auditor informs the Board of any audit findings and/or difficulties incurred through the audit process.

In March, staff issued an RFP for auditing services. Cherry, Bekaret LLP (CB) was chosen due to their audit approach, the firm's staffing, and notably the governmental utility experience in North Carolina. At the April Board Meeting, the Board approved Cherry Bekaret, LLP as auditors.

Discussion

CB takes a rotating partner approach to government and utility engagements. Every five years a new partner is assigned to the engagement. CB believes that this approach ensures that industry standards as well as technical auditing standards are being evaluated at the highest levels. Additionally, CB believes this approach ensures client/auditor independence. Staff believes having a rotating partner approach has helped in refining internal controls and departmental practices.

CB has a large staff that lessens the potential for the risk of delays due to illnesses and resignations. The staff assigned to our engagement has appropriate education and experience. They have coordinated very well with the District's staff to ensure the audit's completion in a timely fashion.

Fiscal Impact

The combined audit fees and reimbursable expenses of $45,000 (See attached engagement letter and audit contract) will be included in the FY2024 budget.

Staff Recommendation

Staff recommends approval of the FY2023 audit contract with Cherry Bekaert, LLP, contingent upon review and approval of District counsel.

Cherry Bekaert LLP
Your Guide Forward

May 1, 2023

VIA EMAIL:
spowell@msdbc.org

The Board of Directors
Metropolitan Sewerage District of Buncombe County, North Carolina
2028 Riverside Drive
Asheville, North Carolina 28804

Dear Mr. Powell:

This engagement letter between Metropolitan Sewerage District of Buncombe County, North Carolina (hereafter referred to as the "District" or "you" or "your" or "management") and Cherry Bekaert LLP (the "Firm" or "Cherry Bekaert" or "we" or "us" or "our") sets forth the nature and scope of the services we will provide, the District's required involvement and assistance in support of our services, the related fee arrangements, and other Terms and Conditions, which are attached hereto and incorporated by reference, designed to facilitate the performance of our professional services and to achieve the mutually agreed-upon objectives of the District.

Summary of services

We will provide the following services to the District as of and for the year ended June 30, 2023:

Audit and attestation services

1. We will audit the basic financial statements of the District as of and for the year ended June 30, 2023 including the statement of net position, the related statement of revenue, expenses and changes in net position and cash flows, including the disclosures.

2. We will audit the supplementary information other than the required supplementary information ("RSI") accompanying the District's basic financial statements. As part of our reconciling such information directly to the underlying accounting and other records used to prepare the financial statements or the financial statements themselves.

3. We will apply limited procedures to management's discussion and analysis ("MD&A") and other required supplementary information, as listed in the table of contents, which will consist of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during the audit of the financial statement.

4. We will read the introductory and statistical section accompanying the financial statements and consider whether a material inconsistency exists between the other information and the basic financial statements. In addition, we will remain alert for indications that a material inconsistency exists between the other information and knowledge obtained in the audit, or if such information contains a material misstatement of fact or is otherwise misleading. If based on the work performed, we conclude that an uncorrected material misstatement of the other information exists, we are required to describe it in our report.

Your expectations

As part of our planning process, we have discussed with you your expectations of Cherry Bekaert, changes that occurred during the year, your views on risks facing you, any relationship issues with Cherry Bekaert, and specific engagement arrangements and timing. Our services plan, which includes our audit plan, is designed to provide a foundation for an effective, efficient, and quality-focused approach to accomplish the engagement objectives and meet or exceed the District's expectations. Our services plan will be reviewed with you periodically and will serve as a benchmark against which you will be able to measure our performance. Any additional services that you may request, and that we agree to provide, will be the subject of separate written arrangements.

The District recognizes that our professional standards require that we be independent from the District in our audit of the District's financial statements and our accompanying report in order to ensure that our objectivity and professional skepticism have not been compromised. As a result, we cannot enter into a fiduciary relationship with the District and the District should not expect that we will act only with due regard to the District's interest in the performance of this audit, and the District should not impose on us special confidence that we will conduct this audit with only the District's interest in mind. Because of our obligation to be independent of the District, no fiduciary relationship will be created by this engagement or audit of the District's financial statements.

The engagement will be led by Daniel T. Gougherty, who will be responsible for assuring the overall quality, value, and timeliness of the services provided to you.

Audit and attestation services

Our audit will be conducted in accordance with auditing standards generally accepted in the United States of America; and the standards for financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. The objective of our audit is to obtain reasonable assurance about whether the District's basic financial statements as a whole are free from material misstatement, whether due to fraud or error, and issue an auditor's report that includes our opinion(s) about whether the District's basic financial statements are presented fairly, in all material respects, in conformity with U.S. generally accepted accounting principles and to report on the fairness of the additional information referred to in the Summary of Services section when considered in relation to the basic financial statements taken as a whole. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with GAAS and *Government Auditing Standards* will always detect a material misstatement when it exists. Misstatements, including omissions, can arise from fraud or error and are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment of a reasonable user made based on the financial statements in conformity with the basis of accounting noted above. The objective also includes reporting on:

- Internal control over financial reporting and compliance with the provisions of applicable laws, regulations, contracts, and grant agreements, noncompliance with which could have a material effect on the financial statements in accordance with *Government Auditing Standards*

Auditor's responsibilities for the audit of the financial statements

We will conduct our audit in accordance with GAAS and the standards for financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States, and will include tests of accounting records and other procedures as deemed necessary to enable us to express such an opinion about whether the financial statements are fairly presented, in all material respects, in conformity with accounting principles generally accepted in the United States of America ("GAAP"). We will also:

- Exercise professional judgment and maintain professional skepticism throughout the audit.

- Obtain an understanding of the District and its environment, including internal control relevant to the audit, sufficient to identify and assess the risks of material misstatement of the financial statements, whether due to error or fraud, and to design and perform audit procedures responsive to those risk, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion(s). The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentation, or the override of internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management. We will also evaluate the overall presentation of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstance, but not for the purpose of expressing an opinion on the effectiveness of the District's internal control. However, we will communicate to you in writing concerning any significant deficiencies or material weaknesses in internal control relevant to the audit of the financial statements that we have identified during the audit.

- Conclude, based on the audit evidence obtained, whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the District's ability to continue as a going concern for a reasonable period of time.

District's management responsibilities related to the audit

The District's management is responsible for designing, implementing, and maintaining internal controls, including evaluating and monitoring ongoing activities, relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error, and to help ensure that appropriate goals and objectives are met; following laws and regulations; and ensuring that the District's management and financial information is reliable and properly reported. The District's management is also responsible for implementing systems designed to achieve compliance with applicable laws, regulations, contracts, and grant agreements. You are also responsible for the selection and application of accounting principles, for the preparation and fair presentation of the financial statements and all accompanying information in conformity with

U.S. generally accepted accounting principles, and for compliance with applicable laws and regulations and the provisions of contracts and grant agreements.

The District's management is responsible for making all financial records and related information available to us, including additional information that is requested for purposes of the audit (including information from outside of the general and subsidiary ledgers), and for the accuracy and completeness of that information. You are also responsible for providing us with (1) access to all information of which it is aware that is relevant to the preparation and fair presentation of the financial statements, such as records, documentation, identification of all related parties and all related-party relationships and transactions, and other matters, (2) additional information that we may request for the purpose of the audit, and (3) unrestricted access to persons within the District from whom we determine it necessary to obtain audit evidence.

Your responsibilities include adjusting the financial statements to correct material misstatements and for confirming to us in the written representation letter that the effects of any uncorrected misstatements aggregated by us during the current engagement and pertaining to the latest period presented are immaterial, both individually and in the aggregate, to the financial statements taken as a whole.

You are responsible for the design and implementation of programs and controls to prevent and detect fraud, and for informing us about all known or suspected fraud affecting the District involving (1) the District's management, (2) employees who have significant roles in internal control, and (3) others where the fraud could have a material effect on the financial statements. Your responsibilities include informing us of your knowledge of any allegations of fraud or suspected fraud affecting the District received in communications from employees, former employees, grantors, regulators, or other. In addition, you are responsible for identifying and ensuring that the District complies with applicable laws, regulations contracts, agreements, and grants and for taking timely and appropriate steps to remedy fraud and noncompliance with provisions of laws, regulations, contracts, or grant agreements that we report.

You are responsible for the preparation of the supplementary information, which we have been engaged to report on, in conformity with U.S. generally accepted accounting principles. You agree to include our report on the supplementary information in any document that contains and indicates that we have reported on the supplementary information. You also agree to include the audited financial statements with any presentation of the supplementary information that includes our report thereon OR make the audited financial statements readily available to users of the supplementary information no later than the date the supplementary information is issued with our report thereon. Your responsibilities include acknowledging to us in the written representation letter that (1) you are responsible for presentation of the supplementary information in accordance with GAAP, (2) you believe the supplementary information, including its form and content, is fairly presented in accordance with GAAP, (3) the methods of measurement or presentation have not changed from those used in the prior period (or, if they have changed, the reasons for such changes), and (4) you have disclosed to us any significant assumptions or interpretations underlying the measurement or presentation of the supplementary information.

The District's management is responsible for establishing and maintaining a process for tracking the status of audit findings and recommendations. The District's management is also responsible for identifying and providing report copies of previous financial audits, attestation engagements, performance audits or other studies related to the objectives discussed in the *Audit and attestation services* section of this letter. This responsibility includes relaying to us

corrective actions taken to address significant findings and recommendations resulting from those audits, attestation engagements, performance audits, or other studies. You are also responsible for providing District's management views on our current findings, conclusions, and recommendations, as well as your planned corrective actions, for the report, and for the timing and format for providing that information.

You agree to assume all the District's management responsibilities relating to the financial statements and disclosures and any other nonaudit services we provide. You will be required to acknowledge in the management representation letter our assistance with preparation of the financial statements and disclosures and that you have reviewed and approved the financial statements and disclosures prior to their issuance and have accepted responsibility for them. Further, you agree to oversee the nonaudit services by designating an individual, preferably from senior management, with suitable skill, knowledge, or experience; evaluate the adequacy and results of those services; and accept responsibility for them.

The District's management is responsible for disclosing to us all documents that comprise the annual report and preparation of the annual report. You agree you will provide us with the final version of all documents comprising the annual report prior to the date of the auditor's report so that required audit procedures can be completed prior to the issuance of the auditor's report. If obtaining the final version of these documents is not possible prior to the date of the auditor's report, then the documents will be provided as soon as practicable, and the District will not issue the annual report prior to providing them to the us and allowing sufficient time to apply required audit procedures. If the documents comprising the annual report are provided after the date of the auditor's report and we concluded that there is a material inconsistency or misstatement then we will take appropriate actions which may include communicating the matter to those charged with governance or obtaining legal advice.

Reporting

We will issue a written report upon completion of our audit of the District's financial statements. Our report will be addressed to Board of Directors of the District. Circumstances may arise in which our report may differ from its expected form and content based on the result of our audit. Depending on the nature of these circumstances, it may be necessary for us to modify our opinion or add emphasis-of-matter or other-matter paragraphs to our auditor's report, or if necessary, withdraw from this engagement. If our opinion is other than unmodified, we will discuss the reasons with you in advance. If, for any reason, we are unable to complete the audit or are unable to form or have not formed an opinion, we may decline to express opinions or issue reports, or may withdraw from this engagement.

We will also provide a report on internal control and compliance, and will include a paragraph that states (1) that the purpose of the report is solely to describe the scope of testing of internal control and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the District's internal control on compliance, and (2) that the report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering internal control over financial reporting and compliance. The paragraph will also state that the report is not suitable for any other purpose. If during our audit we become aware that the District is subject to an audit requirement that is not encompassed in the terms of the engagement, we will communicate to District's management and those charged with governance that an audit in accordance with U.S. generally accepted auditing standards and the standards for financial audits contained in *Government Auditing Standards* may not satisfy the relevant legal, regulatory, or contractual requirements.

Management Representation's

The Firm will rely on the District's management providing the above noted representations to us, both in the planning and performance of the audit, and in considering the fees that we will charge to perform the audit.

Fees

The estimated fees contemplate only the services described in the Summary of Services section of this letter. You may request that we perform additional services not addressed in this engagement letter. If this occurs, we will communicate with you concerning the scope of the additional services and the estimated fees which will be at our standard billing rates noted in the table below. We also may issue a separate engagement letter covering the additional services. In the absence of any other written communication from us documenting such additional services, our services will continue to be governed by the terms of this engagement letter.

The following summarizes the estimated fees for the services described above:

Description of services	Estimated fee
Audit services	
Audit of the financial statements	$45,000

The fees will be billed periodically. Invoices are due on presentation. A service charge will be added to past due accounts equal to 1½% per month (18% annually) on the previous month's balance less payments received during the month, with a minimum charge of $2.00 per month.

If the foregoing is in accordance with your understanding, please sign a copy of this letter in the space provided and return it to us. No change, modification, addition, or amendment to this letter shall be valid unless in writing and signed by all parties. The parties agree that this letter may be electronically signed and that the electronic signatures will be deemed to have the same force and effect as handwritten signatures.

If you have any questions, please call Daniel T. Gougherty at (704) 940-2631.

Sincerely,

CHERRY BEKAERT LLP

ATTACHMENT – Engagement Letter Terms and Conditions

METROPOLITAN SEWERAGE DISTRICT OF BUNCOMBE COUNTY, NORTH CAROLINA

ACCEPTED BY: _____

TITLE: _____ DATE: _____

Cherry Bekaert LLP
Engagement Letter Terms and Conditions

The following terms and conditions are an integral part of the attached engagement letter and should be read in their entirety in conjunction with your review of the letter.

Limitations of the audit report

Should the District wish to include or incorporate by reference these financial statements and our report thereon into *any* other document at some future date, we will consider granting permission to include our report into another such document at the time of the request. However, we may be required by generally accepted auditing standards ("GAAS") to perform certain procedures before we can give our permission to include our report in another document such as an annual report, private placement, regulator filing, official statement, offering of debt securities, etc. You agree that the District will not include or incorporate by reference these financial statements and our report thereon, or our report into any other document without our prior written permission. In addition, to avoid unnecessary delay or misunderstandings, it is important to provide us with timely notice of your intention to issue any such document.

Limitations of the audit process

In conducting the audit, we will perform tests of the accounting records and such other procedures as we consider necessary in the circumstances to provide a reasonable basis for our opinion on the financial statements. We also will assess the accounting principles used and significant estimates made by the District's management, as well as evaluate the overall financial statement presentation.

Our audit will include procedures designed to obtain reasonable assurance of detecting misstatements due to errors or fraud that are material to the financial statements. Absolute assurance is not attainable because of the nature of audit evidence and the characteristics of fraud. For example, audits performed in accordance with GAAS are based on the concept of selective testing of the data being examined and are, therefore, subject to the limitation that material misstatements due to errors or fraud, if they exist, may not be detected. Also, an audit is not designed to detect matters that are immaterial to the financial statements. In addition, an audit conducted in accordance with GAAS does not include procedures specifically designed to detect illegal acts having an indirect effect (e.g., violations of fraud and abuse statutes that result in fines or penalties being imposed on the District) on the financial statements.

Similarly, in performing our audit we will be aware of the possibility that illegal acts may have occurred. However, it should be recognized that our audit provides no assurance that illegal acts generally will be detected, and only reasonable assurance that illegal acts having a direct and material effect on the determination of financial statement amounts will be detected. We will inform you with respect to errors and fraud, or illegal acts that come to our attention during the course of our audit unless clearly inconsequential. In the event that we have to consult with the District's counsel or counsel of our choosing regarding any illegal acts we identify, additional fees incurred may be billed to the District. You agree that the District will cooperate fully with any procedures we deem necessary to perform with respect to these matters.

We will issue a written report upon completion of our audit of the District's financial statements. If, for any reason, we are unable to complete the audit, or are unable to form, or have not formed an opinion on the financial statements, we may decline to express an

opinion or decline to issue a report as a result of the engagement. We will notify the appropriate party within your organization of our decision and discuss the reasons supporting our position.

Audit procedures – general

An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements; therefore, our audit will involve professional judgment about the number of transactions to be examined and the areas to be tested. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by the District's management, as well as evaluating the overall presentation of the financial statements. We will plan and perform the audit to obtain reasonable rather than absolute assurance about whether the financial statements are free of material misstatement, whether from (1) errors, (2) fraudulent financial reporting, (3) misappropriation of assets, or (4) violations of laws or governmental regulations that are attributable to the District or to acts by the District's management or employees acting on behalf of the District. Because the determination of waste and abuse is subjective, *Government Auditing Standards* do not expect auditors to perform specific procedures to detect waste or abuse in financial audits, nor do they expect auditors to provide reasonable assurance of detecting waste and abuse.

Because of the inherent limitations of an audit, combined with the inherent limitations of internal control there is an unavoidable risk that some material misstatements may not be detected by us, even though the audit is properly planned and performed in accordance with U.S. generally accepted auditing standards and *Government Auditing Standards*. In addition, an audit is not designed to detect immaterial misstatements or violations of laws or governmental regulations that do not have a direct and material effect on the financial statements. However, we will inform the appropriate level of the District's management of any material errors, fraudulent financial reporting, or misappropriation of assets that come to our attention. We will also inform the appropriate level of management of any violations of laws or governmental regulations that come to our attention, unless clearly inconsequential. Our responsibility as auditor is limited to the period covered by our audit and does not extend to any later periods for which we are not engaged as auditors.

Our procedures will include tests of documentary evidence supporting the transactions recorded in the accounts, and may include tests of the physical existence of inventories, and direct confirmation of receivables and certain assets and liabilities by correspondence with selected customer, creditors and financial institutions. We will request written representations from the District's attorneys as part of the engagement, and they may bill the District for responding to this inquiry. At the conclusion of our audit, we will also require certain written representations from you about the financial statements; compliance with laws, regulations, contracts, and grant agreements; and other responsibilities required by generally accepted auditing standards.

Audit procedures – internal controls

Our audit will include obtaining an understanding of the District and its environment, including internal controls relevant to the audit, sufficient to identify and assess the risks of material misstatement of the financial statements, whether due to error or fraud, and to design and perform audit procedures responsive to those risks and obtain evidence that is sufficient and appropriate to provide a basis for our opinion(s). The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may

involve collusion, forgery, intentional omissions, misrepresentation, or the override of internal control. Tests of controls may be performed to test the effectiveness of certain controls that we consider relevant to preventing and detecting errors and fraud that are material to the financial statements and to preventing and detecting misstatements resulting from illegal acts and other noncompliance matters that have a direct and material effect on the financial statements. Our tests, if performed, will be less in scope than would be necessary to render an opinion on internal control, including cybersecurity, and, accordingly, no opinion will be expressed in our report on internal control issued pursuant to *Government Auditing Standards.*

An audit is not designed to provide assurance on internal control or to identify significant deficiencies or material weaknesses. However, during the audit, we will communicate to the District's management and those charged with governance internal control related matters that are required to be communicated under American Institute of Certified Public Accountants ("AICPA") professional standards, and *Government Auditing Standards.*

Audit procedures - compliance

As part of obtaining reasonable assurance about whether the basic financial statements are free of material misstatement, we will perform tests of the District's compliance with provisions of applicable laws and regulations, contracts and agreements, including grant agreements. However, the objective of those procedures will not be to provide an opinion on overall compliance and we will not express such an opinion in our report on compliance issued pursuant to *Government Auditing Standards*.

Nonattest services (if applicable)

All nonattest services to be provided in the attached engagement letter (if applicable) shall be provided pursuant to the AICPA Code of Professional Conduct. The AICPA Code of Professional Conduct requires that we establish objectives of the engagement and the services to be performed, which are described under nonattest services in the attached letter.

You agree that the District's designated individual will assume all the District's management responsibilities for the nonattest services we provide; oversee the services by designating an individual, with suitable skill, knowledge, or experience; evaluate the adequacy and results of the services; and accept responsibility for them. In order to ensure we provide such services in compliance with all professional standards, the designated individual is responsible for:

- Making all financial records and related information available to us
- Ensuring that all material information is disclosed to us
- Granting unrestricted access to persons within the entity from whom we determine it necessary to obtain audit evidence
- Identifying and ensuring that such nonattest complies with the laws and regulations

The accuracy and appropriateness of such nonattest services shall be limited by the accuracy and sufficiency of the information provided by the District's designated individual. In the course of providing such nonattest services, we may provide professional advice and guidance based on knowledge of accounting, tax and other compliance, and of the facts and circumstances as provided by the District's designated individual. Such advice and guidance shall be limited as permitted under the AICPA Code of Professional Conduct.

Communications

At the conclusion of the audit engagement, we may provide the District‘s management and those charged with governance a letter stating any significant deficiencies or material weaknesses which may have been identified by us during the audit and our recommendations designed to help the District make improvements in its internal control structure and operations related to the identified matters discovered in the financial statement audit. As part of this engagement, we will ensure that certain additional matters are communicated to the appropriate members of the District. Such matters include (1) our responsibilities under GAAS, (2) the initial selection of and changes in significant accounting policies and their application, (3) our independence with respect to the District, (4) the process used by District‘s management in formulating particularly sensitive accounting estimates and the basis for our conclusion regarding the reasonableness of those estimates, (5) audit adjustments, if any, that could, in our judgment, either individually or in the aggregate be significant to the financial statements or our report, (6) any disagreements with the District‘s management concerning a financial accounting, reporting, or auditing matter that could be significant to the financial statements, (7) our views about matters that were the subject of the District‘s management’s consultation with other accountants about auditing and accounting matters, (8) major issues that were discussed with the District‘s management in connection with the retention of our services, including, among other matters, any discussions regarding the application of accounting principles and auditing standards, and (9) serious difficulties that we encountered in dealing with the District‘s management related to the performance of the audit.

Other matters

Access to working papers

The working papers and related documentation for the engagement are the property of the Firm and constitute confidential information. We have a responsibility to retain the documentation for a period of time to satisfy legal or regulatory requirements for records retention. It is our policy to retain all workpapers and client information for seven years from the date of issuance of the report. It is our policy to retain emails and attachments to emails for a period of 12 months, except as required by any governmental regulation. Except as discussed below, any requests for access to our working papers will be discussed with you prior to making them available to requesting parties. Any parties seeking voluntary access to our working papers must agree to sign our standard access letter.

We may be requested to make certain documentation available to regulators, governmental agencies (e.g., SEC, PCAOB, HUD, DOL, etc.), or their representatives (“Regulators”) pursuant to law or regulations. If requested, access to the documentation will be provided to the Regulators. The Regulators may intend to distribute to others, including other governmental agencies, our working papers and related documentation without our knowledge or express permission. You hereby acknowledge and authorize us to allow Regulators access to and copies of documentation as requested. In addition, our Firm, as well as all other major accounting firms, participates in a “peer review” program covering our audit and accounting practices as required by the AICPA. This program requires that once every three years we subject our quality assurance practices to an examination by another accounting firm. As part of the process, the other firm will review a sample of our work. It is possible that the work we perform for the District may be selected by the other firm for their review. If it is, they are bound by professional standards to keep all information confidential. If you object to having the work we do for you reviewed by our peer reviewer, please notify us in writing.

Electronic transmittals

During the course of our engagement, we may need to electronically transmit confidential information to each other, within the Firm, and to other entities engaged by either party. Although email is an efficient way to communicate, it is not always a secure means of communication and thus, confidentiality may be compromised. As an alternative, we recommend using our Client Portal ("Portal") to transmit documents. Portal allows the District, us, and other involved entities to upload and download documents in a secure location. You agree to the use of email, Portal, and other electronic methods to transmit and receive information, including confidential information, between the Firm, the District, and other third party providers utilized by either party in connection with the engagement.

Use of third party providers and alternative practice structure

Cherry Bekaert LLP and Cherry Bekaert Advisory LLC (an associated, but not affiliated entity) are parties to an administrative services agreement ("ASA"). Cherry Bekaert LLP and Cherry Bekaert Advisory LLC are operating in an arrangement commonly described as an "alternative practice structure". Pursuant to the ASA, Cherry Bekaert LLP leases professional and administrative staff, both of which are employed by Cherry Bekaert Advisory LLC, to support Cherry Bekaert LLP's performance under this engagement letter. As a result, Cherry Bekaert LLP will share your confidential information with Cherry Bekaert Advisory LLC so that the leased employees are able to support Cherry Bekaert LLP's performance under this engagement letter. These leased employees are under the direct control and supervision of Cherry Bekaert LLP, which is solely responsible for the professional performance of the services under this engagement letter. The leased employees are subject to the standards governing the accounting profession, including the requirement to maintain the confidentiality of client information, and Cherry Bekaert LLP and Cherry Bekaert Advisory LLC have contractual agreements requiring confidential treatment of all client information.

To the extent Cherry Bekaert Advisory LLC will provide tax, advisory, and/or consulting services to you, Cherry Bekaert LLP will provide Cherry Bekaert Advisory LLC with access to your accounting, financial, and other records that Cherry Bekaert LLP maintains to enable Cherry Bekaert Advisory LLC to provide those services to you.

In addition to the structure noted above, in the normal course of business, we may on occasion use the services of an independent contractor or a temporary or loaned employee, all of whom may be considered a third party service provider. On these occasions, we remain responsible for the adequate oversight of all services performed by the third party service provider and for ensuring that all services are performed with professional competence and due professional care. We will adequately plan and supervise the services provided by the third party service provider; obtain sufficient relevant data to support the work product; and review compliance with technical standards applicable to the professional services rendered. We will enter into a contractual agreement with the third party service provider to maintain the confidentiality of information and be reasonably assured that the third party service provider has appropriate procedures in place to prevent the unauthorized release of confidential information to others.

Subpoenas

In the event we are requested or authorized by the District, or required by government regulation, subpoena, or other legal process to produce our working papers or our personnel as witnesses with respect to our engagement for the District, the District will, so long as we

are not a party to the proceeding in which the information is sought, reimburse us for our professional time and expense, as well as the fees and expenses of our counsel, incurred in responding to such a request at standard billing rates.

Dispute resolution provision

This Dispute Resolution Provision sets forth the dispute resolution process and procedures applicable to any dispute or claim arising out of or relating to this engagement letter or the services provided hereunder, or any other audit or attest services provided by or on behalf of the Firm or any of its subcontractors or agents to the District or at its request ("Disputes"), and shall apply to the fullest extent of the law, whether in contract, statute, tort (such as negligence), or otherwise.

Mediation

All Disputes shall be first submitted to nonbinding confidential mediation by written notice to the parties, and shall be treated as compromise and settlement negotiations under the standards set forth in the Federal Rules of Evidence and all applicable state counterparts, together with any applicable statutes protecting the confidentiality of mediations or settlement discussions. If the parties cannot agree on a mediator, the International Institute for Conflict Prevention and Resolution ("CPR"), at the written request of a party, shall designate a mediator.

Arbitration procedures

If a Dispute has not been resolved within 90 days after the effective date of the written notice beginning the mediation process (or such longer period, if the parties so agree in writing), the mediation shall terminate and the Dispute shall be settled by binding arbitration to be held at a mutually agreeable location. The arbitration shall be conducted in accordance with the CPR Rules for Non-Administered Arbitration that are in effect at the time of the commencement of the arbitration, except to the extent modified by this Dispute Resolution Provision (the "Rules"). The arbitration shall be conducted before a panel of three arbitrators. Each of the District and the Firm shall designate one arbitrator in accordance with the "screened" appointment procedure provided in the Rules, and the two party-designated arbitrators shall jointly select the third in accordance with the Rules. No arbitrator may serve on the panel unless he or she has agreed in writing to enforce the terms of the engagement letter and to abide by the terms of the Rules. Except with respect to the interpretation and enforcement of these arbitration procedures (which shall be governed by the Federal Arbitration Act), the arbitrators shall apply the laws of the Commonwealth of Virginia (without giving effect to its choice of law principles) in connection with the Dispute. The arbitrators may render a summary disposition relative to all or some of the issues, provided that the responding party has had an adequate opportunity to respond to any such application for such disposition. Any discovery shall be conducted in accordance with the Rules. The result of the arbitration shall be binding on the parties, and judgment on the arbitration award may be entered in any court having jurisdiction.

Costs

Each party shall bear its own costs in both the mediation and the arbitration; however, the parties shall share the fees and expenses of both the mediators and the arbitrators equally.

Waiver of trial by jury

In the event the parties are unable to successfully arbitrate any dispute, controversy, or claim, the parties agree to WAIVE TRIAL BY JURY and agree that the court will hear any matter without a jury.

Independent contractor

Each party is an independent contractor with respect to the other and shall not be construed as having a trustee, joint venture, agency, or fiduciary relationship.

No third party beneficiaries

The parties do not intend to benefit any third party by entering into this agreement, and nothing contained in this agreement confers any right or benefit upon any person or entity who or which is not a signatory of this agreement.

Statute of limitations

The District agrees not to bring any claims against any partner or employee of the Firm in any form for any reason. The District and the Firm agree that any suit arising out of or related to the services contemplated by this engagement letter must be filed within one year after the cause of action arises. The cause of action arises upon the earlier of (i) delivery of the final work product for which the firm has been engaged, (ii) where applicable, filing of the final work product for which the firm has been engaged, or (iii) the date which the services contemplated under this engagement letter are terminated by either party.

Terms and conditions supporting fees

The estimated fees set forth in the attached engagement letter are based on anticipated full cooperation from the District's personnel, timely delivery of requested audit schedules and supporting information, timely communication of all significant accounting and financial reporting matters, the assumption that unexpected circumstances will not be encountered during the audit, as well as working space and clerical assistance as mutually agreed upon and as is normal and reasonable in the circumstances. We strive to ensure that we have the right professionals scheduled on each engagement. As a result, sudden District requested scheduling changes or scheduling changes necessitated by the agreed information not being ready on the agreed-upon dates can result in expensive downtime for our professionals. Any last minute schedule changes that result in downtime for our professionals could result in additional fees. Our estimated fees do not include assistance in bookkeeping or other accounting services not previously described. If, for any reason, the District is unable to provide such schedules, information, and assistance, the Firm and the District will mutually revise the fee to reflect additional services, if any, required of us to achieve these objectives.

The estimated fees contemplate that the District will provide adequate documentation of its systems and controls related to significant transaction cycles and audit areas.

In providing our services, we will consult with the District with respect to matters of accounting, financial reporting, or other significant business issues as permitted by professional standards. Accordingly, time necessary to affect a reasonable amount of such consultation is reflected in our fees. However, should a matter require research, consultation, or audit work beyond that amount, the Firm and the District will agree to an appropriate revision in our fee.

The estimated fees are based on auditing and accounting standards effective as of the date of this engagement letter and known to apply to the District at this time. Unless otherwise indicated, estimated fees do not include any time related to the application of new auditing or accounting standards that impact the District for the first time. If new auditing or accounting standards are issued subsequent to the date of this letter and are effective for the period under audit, we will estimate the impact of any such standard on the nature, timing, and extent of our planned audit procedures and will communicate with the District concerning the scope of the additional procedures and the estimated fees.

The District agrees to pay all costs of collection (including reasonable attorneys' fees) that the Firm may incur in connection with the collection of unpaid invoices. In the event of nonpayment of any invoice rendered by us, we retain the right to (a) suspend the performance of our services, (b) change the payment conditions under this engagement letter, or (c) terminate our services. If we elect to suspend our services, such services will not be resumed until your account is paid. If we elect to terminate our services for nonpayment, the District will be obligated to compensate us for all time expended and reimburse us for all expenses through the date of termination.

This engagement letter sets forth the entire understanding between the District and the Firm regarding the services described herein and supersedes any previous proposals, correspondence, and understandings whether written or oral. Any subsequent changes to the terms of this letter, other than additional billings, will be rendered in writing and shall be executed by both parties. Should any portion of this engagement letter be ruled invalid, it is agreed that such invalidity will not affect any of the remaining portions.

EisnerAmper LLP
111 Wood Avenue South
Iselin, NJ 08830-2700
T 732.243.7000
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www.eisneramper.com

Report on the Firm's System of Quality Control

November 29, 2022

To the Partners of Cherry Bekaert LLP and the National Peer Review Committee

We have reviewed the system of quality control for the accounting and auditing practice of Cherry Bekaert LLP (the firm) applicable to engagements not subject to PCAOB permanent inspection in effect for the year ended April 30, 2022. Our peer review was conducted in accordance with the Standards for Performing and Reporting on Peer Reviews established by the Peer Review Board of the American Institute of Certified Public Accountants (Standards).

A summary of the nature, objectives, scope, limitations of, and the procedures performed in a system review as described in the Standards may be found at www.aicpa.org/prsummary. The summary also includes an explanation of how engagements identified as not performed or reported on in conformity with applicable professional standards, if any, are evaluated by a peer reviewer to determine a peer review rating.

Firm's Responsibility

The firm is responsible for designing and complying with a system of quality control to provide the firm with reasonable assurance of performing and reporting in conformity with the requirements of applicable professional standards in all material respects. The firm is also responsible for evaluating actions to promptly remediate engagements deemed as not performed or reported on in conformity with the requirements of applicable professional standards, when appropriate, and for remediating weaknesses in its system of quality control, if any.

Peer Reviewer's Responsibility

Our responsibility is to express an opinion on the design of and compliance with the firm's system of quality control based on our review.

Required Selections and Considerations

Engagements selected for review included engagements performed under Government Auditing Standards, including compliance audits under the Single Audit Act; audits of employee benefit plans; an audit performed under FDICIA; and an examination of service organizations (SOC 2 engagement).

As a part of our peer review, we considered reviews by regulatory entities as communicated by the firm, if applicable, in determining the nature and extent of our procedures.

Opinion

In our opinion, the system of quality control for the accounting and auditing practice of Cherry Bekaert LLP applicable to engagements not subject to PCAOB permanent inspection in effect for the year ended April 30, 2022, has been suitably designed and complied with to provide the firm with reasonable assurance of performing and reporting in conformity with applicable professional standards in all material respects. Firms can receive a rating of pass, pass with deficiency(ies), or fail. Cherry Bekaert LLP has received a peer review rating of pass.

EisnerAmper LLP
Iselin, New Jersey

The | Governing Board: Board of Directors

of | Primary Government Unit: Metropolitan Sewerage District of Buncombe County, North Carolina

and | Discretely Presented Component Unit (DPCU) (if applicable): N/A

Primary Government Unit, together with DPCU (if applicable), hereinafter referred to as Governmental Unit(s)

and | Auditor Name: Cherry Bekaert LLP

Auditor Address: 1111 Metropolitan Avenue, Suite 900, Charlotte, NC 28204

Hereinafter referred to as Auditor

for | Fiscal Year Ending: 06/30/23 | Date Audit Will Be Submitted to LGC: 10/31/23

Must be within four months of FYE

hereby agree as follows:

1. The Auditor shall audit all statements and disclosures required by U.S. generally accepted auditing standards (GAAS) and additional required legal statements and disclosures of all funds and/or divisions of the Governmental Unit(s). The non-major combining, and individual fund statements and schedules shall be subjected to the auditing procedures applied in the audit of the basic financial statements and an opinion shall be rendered in relation to (as applicable) the governmental activities, the business- type activities, the aggregate DPCUs, each major governmental and enterprise fund, and the aggregate remaining fund information (non-major government and enterprise funds, the internal service fund type, and the fiduciary fund types). The basic financial statements shall include budgetary comparison information in a budgetary comparison statement, rather than as RSI, for the General Fund and any annually budgeted Special Revenue funds.

2. At a minimum, the Auditor shall conduct the audit and render the report in accordance with GAAS. The Auditor shall perform the audit in accordance with *Government Auditing Standards (GAGAS)* if the Governmental Unit expended $100,000 or more in combined Federal and State financial assistance during the reporting period. The auditor shall perform a Single Audit if required by Title 2 US Code of Federal Regulations Part 200 *Uniform Administration Requirements, Cost Principles, and Audit Requirements for Federal Awards, Subpart F* (Uniform Guidance) or the State Single Audit Implementation Act. This audit and all associated audit documentation may be subject to review by Federal and State agencies in accordance with Federal and State laws, including the staffs of the Office of State Auditor (OSA) and the Local Government Commission (LGC). If the audit requires a federal single audit in accordance with the Uniform Guidance (§200.501), it is recommended that the Auditor and Governmental Unit(s) jointly agree, in advance of the execution of this contract, which party is responsible for submission of the audit and the accompanying data collection form to the Federal Audit Clearinghouse as required under the Uniform Guidance (§200.512).

Effective for audits of fiscal years beginning after June 30, 2023, the LGC will allow auditors to consider whether a unit qualifies as a State low-risk auditee based upon federal criteria in the Uniform Guidance §200.520(a), and (b) through (e) as it applies to State awards. In addition to the federal criteria in the Uniform Guidance, audits must have been submitted timely to the LGC. If in the reporting year, or in either of the two previous years, the unit reported a Financial Performance Indicator of Concern that the audit was late, then

the report was not submitted timely for State low-risk auditee status. Please refer to "Discussion of Single Audits in North Carolina" on the LGC's website for more information.

If the audit and Auditor communication are found in this review to be substandard, the results of the review may be forwarded to the North Carolina State Board of CPA Examiners (NC State Board).

3. If an entity is determined to be a component of another government as defined by the group audit standards, the entity's auditor shall make a good faith effort to comply in a timely manner with the requests of the group auditor in accordance with AU-6 §600.41 - §600.42.

4. This contract contemplates an unmodified opinion being rendered. If during the process of conducting the audit, the Auditor determines that it will not be possible to render an unmodified opinion on the financial statements of the unit, the Auditor shall contact the LGC Staff to discuss the circumstances leading to that conclusion as soon as is practical and before the final report is issued. The audit shall include such tests of the accounting records and such other auditing procedures as are considered by the Auditor to be necessary in the circumstances. Any limitations or restrictions in scope which would lead to a qualification should be fully explained in an attachment to this contract.

5. If this audit engagement is subject to the standards for audit as defined in *Government Auditing Standards*, 2018 revision, issued by the Comptroller General of the United States, then by accepting this engagement, the Auditor warrants that he/she has met the requirements for a peer review and continuing education as specified in *Government Auditing Standards*. The Auditor agrees to provide a copy of the most recent peer review report to the Governmental Unit(s) and the Secretary of the LGC prior to the execution of an audit contract. Subsequent submissions of the report are required only upon report expiration or upon auditor's receipt of an updated peer review report. If the audit firm received a peer review rating other than pass, the Auditor shall not contract with the Governmental Unit(s) without first contacting the Secretary of the LGC for a peer review analysis that may result in additional contractual requirements.

If the audit engagement is not subject to *Government Auditing Standards* or if financial statements are not prepared in accordance with U.S. generally accepted accounting principles (GAAP) and fail to include all disclosures required by GAAP, the Auditor shall provide an explanation as to why in an attachment to this contract or in an amendment.

6. It is agreed that time is of the essence in this contract. All audits are to be performed and the report of audit submitted to LGC Staff within four months of fiscal year end. If it becomes necessary to amend the audit fee or the date that the audit report will be submitted to the LGC, an amended contract along with a written explanation of the change shall be submitted to the Secretary of the LGC for approval.

7. It is agreed that GAAS include a review of the Governmental Unit's (Units') systems of internal control and accounting as same relate to accountability of funds and adherence to budget and law requirements applicable thereto; that the Auditor shall make a written report, which may or may not be a part of the written report of audit, to the Governing Board setting forth his/her findings, together with his recommendations for improvement. That written report shall include all matters defined as "significant deficiencies and material weaknesses" in AU-C 265 of the *AICPA Professional Standards (Clarified)*. The Auditor shall file a copy of that report with the Secretary of the LGC.

For GAAS or *Government Auditing Standards* audits, if an auditor issues an AU-C §260 report, commonly referred to as "Governance Letter," LGC staff does not require the report to be submitted unless the auditor cites significant findings or issues from the audit, as defined in AU-C §260.12 - .14. This would include issues such as difficulties encountered during the audit, significant or unusual transactions, uncorrected misstatements, matters that are difficult or contentious reviewed with those charged with governance, and other significant matters.

8. All local government and public authority contracts for audit or audit-related work require the approval of the Secretary of the LGC. This includes annual or special audits, agreed upon procedures related to internal controls, bookkeeping or other assistance necessary to prepare the Governmental Unit's records for audit, financial statement preparation, any finance-related investigations, or any other audit- related work in the State of North Carolina. Approval is also required for the Alternative Compliance Examination Engagement for auditing the Coronavirus State and Local Fiscal Recovery Funds expenditures as allowed by US Treasury. Approval is not required on audit contracts and invoices for system improvements and similar services of a non-auditing nature.

9. Invoices for services rendered under these contracts shall not be paid by the Governmental Unit(s) until the invoice has been approved by the Secretary of the LGC. This also includes any progress billings [G.S. 159-34 and 115C-447]. All invoices for audit work shall be submitted in PDF format to the Secretary of the LGC for approval. the invoice marked 'approved' with approval date shall be returned to the Auditor to present to the Governmental Unit(s) for payment. This paragraph is not applicable to contracts for audits of hospitals.

10. In consideration of the satisfactory performance of the provisions of this contract, the Governmental Unit(s) shall pay to the Auditor, upon approval by the Secretary of the LGC if required, the fee, which includes any costs the Auditor may incur from work paper or peer reviews or any other quality assurance program required by third parties (federal and state grantor and oversight agencies or other organizations) as required under the Federal and State Single Audit Acts. This does not include fees for any pre-issuance reviews that may be required by the NC Association of CPAs (NCACPA) Peer Review Committee or NC State Board of CPA Examiners (see Item 13).

11. If the Governmental Unit(s) has/have outstanding revenue bonds, the Auditor shall submit to LGC Staff, either in the notes to the audited financial statements or as a separate report, a calculation demonstrating compliance with the revenue bond rate covenant. Additionally, the Auditor shall submit to LGC Staff simultaneously with the Governmental Unit's (Units') audited financial statements any other bond compliance statements or additional reports required by the authorizing bond documents, unless otherwise specified in the bond documents.

12. After completing the audit, the Auditor shall submit to the Governing Board a written report of audit. This report shall include, but not be limited to, the following information: (a) Management's Discussion and Analysis, (b) the financial statements and notes of the Governmental Unit(s) and all of its component units prepared in accordance with GAAP, (c) supplementary information requested by the Governmental Unit(s) or required for full disclosure under the law, and (d) the Auditor's opinion on the material presented. The Auditor shall furnish the required number of copies of the report of audit to the Governing Board upon completion.

13. If the audit firm is required by the NC State Board, the NCACPA Peer Review Committee, or the Secretary of the LGC to have a pre-issuance review of its audit work, there shall be a statement in the engagement letter indicating the pre-issuance review requirement. There also shall be a statement that the Governmental Unit(s) shall not be billed for the pre-issuance review. The pre-issuance review shall be performed prior to the completed audit being submitted to LGC Staff. The pre-issuance review report shall accompany the audit report upon submission to LGC Staff.

14. The Auditor shall submit the report of audit in PDF format to LGC Staff. For audits of units other than hospitals, the audit report should be submitted when (or prior to) submitting the final invoice for services rendered. The report of audit, as filed with the Secretary of the LGC, becomes a matter of public record for inspection, review and copy in the offices of the LGC by any interested parties. Any subsequent revisions to these reports shall be sent to the Secretary of the LGC. These audited financial statements, excluding the Auditors' opinion, may be used in the preparation of official statements for debt offerings by municipal bond rating services to fulfill secondary market disclosure requirements of the Securities and Exchange Commission and for other lawful purposes of the Governmental Unit(s) without requiring consent of the Auditor. If the LGC Staff determines that corrections need to be made to the Governmental Unit's (Units') financial statements and/or the compliance section, those corrections shall be provided within three business days of notification unless another deadline is agreed to by LGC Staff.

15. Should circumstances disclosed by the audit call for a more detailed investigation by the Auditor than necessary under ordinary circumstances, the Auditor shall inform the Governing Board in writing of the need for such additional investigation and the additional compensation required therefore. Upon approval by the Secretary of the LGC, this contract may be modified or amended to include the increased time, compensation, or both as may be agreed upon by the Governing Board and the Auditor.

16. If an approved contract needs to be modified or amended for any reason, the change shall be made in writing and pre-audited if the change includes a change in audit fee (pre-audit requirement does not apply to hospitals). This amended contract shall be completed in full, including a written explanation of the change, signed and dated by all original parties to the contract. It shall then be submitted to the Secretary of the LGC for approval. No change to the audit contract shall be effective unless approved by the Secretary of the LGC, the Governing Board, and the Auditor.

17. A copy of the engagement letter, issued by the Auditor and signed by both the Auditor and the Governmental Unit(s), shall be attached to this contract, and except for fees, work, and terms not related to audit services, shall be incorporated by reference as if fully set forth herein as part of this contract. In case of conflict between the terms of the engagement letter and the terms of this contract, the terms of this contract shall take precedence. Engagement letter terms that conflict with the contract are deemed to be void unless the conflicting terms of this contract are specifically deleted in Item 30 of this contract. Engagement letters containing indemnification clauses shall not be accepted by LGC Staff.

18. Special provisions should be limited. Please list any special provisions in an attachment.

19. A separate contract should not be made for each division to be audited or report to be submitted. If a DPCU is subject to the audit requirements detailed in the Local Government Budget and Fiscal Control Act and a separate audit report is issued, a separate audit contract is required. If a separate report is not to be issued and the DPCU is included in the primary government audit, the DPCU shall be named along with the primary government on this audit contract. DPCU Board approval date, signatures from the DPCU Board chairman and finance officer also shall be included on this contract.

20. The contract shall be executed, pre-audited (pre-audit requirement does not apply to hospitals), and physically signed by all parties including Governmental Unit(s) and the Auditor, then submitted in PDF format to the Secretary of the LGC.

21. The contract is not valid until it is approved by the Secretary of the LGC. The staff of the LGC shall notify the Governmental Unit and Auditor of contract approval by email. The audit should not be started before the contract is approved.

22. Retention of Client Records: Auditors are subject to the NC State Board of CPA Examiners' Retention of Client Records Rule 21 NCAC 08N .0305 as it relates to the provision of audit and other attest services, as well as non-attest services. Clients and former clients should be familiar with the requirements of this rule prior to requesting the return of records.

23. This contract may be terminated at any time by mutual consent and agreement of the Governmental Unit(s) and the Auditor, provided that (a) the consent to terminate is in writing and signed by both parties, (b) the parties have agreed on the fee amount which shall be paid to the Auditor (if applicable), and (c) no termination shall be effective until approved in writing by the Secretary of the LGC.

24. The Governmental Unit's (Units') failure or forbearance to enforce, or waiver of, any right or an event of breach or default on one occasion or instance shall not constitute the waiver of such right, breach or default on any subsequent occasion or instance.

25. There are no other agreements between the parties hereto and no other agreements relative hereto that shall be enforceable unless entered into in accordance with the procedure set out herein and approved by the Secretary of the LGC.

26. E-Verify. Auditor shall comply with the requirements of NCGS Chapter 64 Article 2. Further, if Auditor utilizes any subcontractor(s), Auditor shall require such subcontractor(s) to comply with the requirements of NCGS Chapter 64, Article 2.

27. **Applicable to audits with fiscal year ends of June 30, 2020 and later.** For all non-attest services, the Auditor shall adhere to the independence rules of the AICPA Professional Code of Conduct and *Government Auditing Standards, 2018 Revision* (as applicable). Financial statement preparation assistance shall be deemed a "significant threat" requiring the Auditor to apply safeguards sufficient to reduce the threat to an acceptable level. If the Auditor cannot reduce the threats to an acceptable level, the Auditor cannot complete the audit. If the Auditor is able to reduce the threats to an acceptable level, the documentation of this determination, including the safeguards applied, must be included in the audit workpapers.

All non-attest service(s) being performed by the Auditor that are necessary to perform the audit must be identified and included in this contract. The Governmental Unit shall designate an individual with the suitable skills, knowledge, and/or experience (SKE) necessary to oversee the services and accept responsibility for the results of the services performed. If the Auditor is able to identify an individual with the appropriate SKE, s/he must document and include in the audit workpapers how he/she reached that conclusion. If the Auditor determines that an individual with the appropriate SKE cannot be identified, the Auditor cannot perform both the non-attest service(s) and the audit. See "Fees for Audit Services" page of this contract to disclose the person identified as having the appropriate SKE for the Governmental Unit.

28. **Applicable to audits with fiscal year ends of June 30, 2021 and later. T**he auditor shall present the audited financial statements including any compliance reports to the government unit's governing body or audit committee in an official meeting in open session as soon as the audited financial statements are available but not later than 45 days after the submission of the audit report to the Secretary. The auditor's presentation to the government unit's governing body or audit committee shall include:

a) the description of each finding, including all material weaknesses and significant deficiencies, as found by the auditor, and any other issues related to the internal controls or fiscal health of the government unit as disclosed in the management letter, the Single Audit or Yellow Book reports, or any other communications from the auditor regarding internal controls as required by current auditing standards set by the Accounting Standards Board or its successor;
b) the status of the prior year audit findings;
c) the values of Financial Performance Indicators based on information presented in the audited financial statements; and
d) notification to the governing body that the governing body shall develop a "Response to the Auditor's Findings, Recommendations, and Fiscal Matters," if required under 20 NCAC 03 .0508.

29. Information based on the audited financial statements shall be submitted to the Secretary for the purpose of identifying Financial Performance Indicators and Financial Performance Indicators of Concern. See 20 NCAC 03 .0502(c)(6).

30. All of the above paragraphs are understood and shall apply to this contract, except the following numbered paragraphs shall be deleted (See Item 17 for clarification).

31. The process for submitting contracts, audit reports and invoices is subject to change. Auditors and units should use the submission process and instructions in effect at the time of submission. Refer to the N.C. Department of State Treasurer website at https://www.nctreasurer.com/state-and-local-government-finance-division/local-government-commission/submitting-your-audit

32. All communications regarding audit contract requests for modification or official approvals will be sent to the email addresses provided on the signature pages that follow.

33. Modifications to the language and terms contained in this contract form (LGC-205) are not allowed.

FEES FOR AUDIT SERVICES

1. For all non-attest services, the Auditor shall adhere to the independence rules of the AICPA Professional Code of Conduct (as applicable) and *Government Auditing Standards,2018 Revision*. Refer to Item 27 of this contract for specific requirements. The following information must be provided by the Auditor; contracts presented to the LGC without this information will be not be approved.

Financial statements were prepared by: ☐ Auditor ☑ Governmental Unit ☐ Third Party

If applicable: Individual at Governmental Unit designated to have the suitable skills, knowledge, and/or experience (SKE) necessary to oversee the non-attest services and accept responsibility for the results of these services:

Name:	***Title and Unit / Company:***	***Email Address:***

OR Not Applicable ☑ *(Identification of SKE Individual on the LGC-205 Contract is not applicable for GAAS-only audits or audits with FYEs prior to June 30, 2020.)*

2. Fees may not be included in this contract for work performed on Annual Financial Information Reports (AFIRs), Form 990s, or other services not associated with audit fees and costs. Such fees may be included in the engagement letter but may not be included in this contract or in any invoices requiring approval of the LGC. See Items 8 and 13 for details on other allowable and excluded fees.

3. The audit fee information included in the table below for both the Primary Government Fees and the DPCU Fees (if applicable) should be reported as a specific dollar amount of audit fees for the year under this contract. If any language other than an amount is included here, the contract will be returned to the audit form for correction.

4. Prior to the submission of the completed audited financial report and applicable compliance reports subject to this contract, or to an amendment to this contract (if required) the Auditor may submit interim invoices for approval for services rendered under this contract to the Secretary of the LGC, not to exceed 75% of the billings for the unit's last annual audit that was submitted to the Secretary of the LGC. All invoices for services rendered in an audit engagement as defined in 20 NCAC .0503 shall be submitted to the Commission for approval before any payment is made. Payment before approval is a violation of law. (This paragraph not applicable to contracts and invoices associated with audits of hospitals).

PRIMARY GOVERNMENT FEES

Primary Government Unit	Metropolitan Sewerage District of Buncombe County, North Carolin
Audit Fee	$ 45,000
Additional Fees Not Included in Audit Fee:	
Fee per Major Program	$
Writing Financial Statements	$
All Other Non-Attest Services	$

DPCU FEES (if applicable)

Discretely Presented Component Unit	N/A
Audit Fee	$
Additional Fees Not Included in Audit Fee:	
Fee per Major Program	$
Writing Financial Statements	$
All Other Non-Attest Services	$

SIGNATURE PAGE

AUDIT FIRM

Audit Firm* Cherry Bekaert LLP	
Authorized Firm Representative (typed or printed)* Daniel T. Gougherty	Signature* Daniel T Gougherty
Date* 05/01/23	Email Address* dgougherty@cbh.com

GOVERNMENTAL UNIT

Governmental Unit* Metropolitan Sewerage District of Buncombe County, North Carolina	
Date Primary Government Unit Governing Board Approved Audit Contract* (G.S.159-34(a) or G.S.115C-447(a))	
Mayor/Chairperson (typed or printed)*	Signature*
Date	Email Address

Chair of Audit Committee (typed or printed, or "NA")	Signature
Date	Email Address

GOVERNMENTAL UNIT – PRE-AUDIT CERTIFICATE

Required by G.S. 159-28(a1) or G.S. 115C-441(a1).
Not applicable to hospital contracts.

This instrument has been pre-audited in the manner required by The Local Government Budget and Fiscal Control Act or by the School Budget and Fiscal Control Act.

Primary Governmental Unit Finance Officer* (typed or printed)	Signature*
Date of Pre-Audit Certificate*	Email Address*

SIGNATURE PAGE – DPCU
(complete only if applicable)

DISCRETELY PRESENTED COMPONENT UNIT

DPCU* N/A	
Date DPCU Governing Board Approved Audit Contract* (Ref: G.S. 159-34(a) or G.S. 115C-447(a))	
DPCU Chairperson (typed or printed)*	Signature*
Date*	Email Address*

Chair of Audit Committee (typed or printed, or "NA")	Signature
Date	Email Address

DPCU – PRE-AUDIT CERTIFICATE

Required by G.S. 159-28(a1) or G.S. 115C-441(a1).
Not applicable to hospital contracts.

This instrument has been pre-audited in the manner required by The Local Government Budget and Fiscal Control Act or by the School Budget and Fiscal Control Act.

DPCU Finance Officer (typed or printed)*	Signature*
Date of Pre-Audit Certificate*	Email Address*

Remember to print this form, and obtain all required signatures prior to submission.

PRINT

Metropolitan Sewerage District of Buncombe County
BOARD ACTION ITEM

Meeting Date: May 17, 2023

Submitted By: Thomas E. Hartye, PE., General Manager

Prepared By: W. Scott Powell, CLGFO, Director of Finance

Subject: Consideration of Budget Amendment for Debt Service

Background
To be in compliance with North Carolina General Statutes, all expenditures must be included in the governing body's adopted annual balanced budget ordinance. In the event unforeseen expenditures occur which exceed the adopted amount, a budget amendment resolution must be approved by the governing body. The proposed budget amendment resolution identifies the nature of the expenditure as well as the source of funding.

Discussion
In FY2023, the board approved $8.9 million for debt service. The amount should have been $9.7million. Staff mistakenly used the District's debt covenant calculation for debt service as opposed to actual debt service for the fiscal year. As such, staff recommends amending the Debt Service Fund in the amount of $800,000.

Staff Recommendation
Staff recommends the approval of the attached Budget Amendment Resolution.

Action Taken

Motion by:	to	Approve	Disapprove
Second by:		Table	Send to Committee
Other:			
Follow-up required:			
Person responsible:		**Deadline:**	

BUDGET AMENDMENT RESOLUTION
FOR THE
METROPOLITAN SEWERAGE DISTRICT
OF BUNCOMBE COUNTY, NORTH CAROLINA

WHEREAS, the Metropolitan Sewerage District of Buncombe County, North Carolina (the "Issuer") is a body politic and corporate organized and existing under the laws of the State of North Carolina; and

WHEREAS, the General Manager and Finance Director recommend and the District Board now desires to amend the FY2022-FY2023 Revenue and Debt Service funds outlined below.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD AS FOLLOWS:

Section 1. The Board hereby adopts the amendment to the Revenue Fund listed below.

Transfer to Debt Service Fund	$800,000

It is estimated that the following revenues will be available in the Revenue Fund:

Appropriated from Net Position	$800,000

Section 2. The Board hereby adopts the amendment to the Debt Service Fund listed below.

Debt Service Expenditures	$800,000

It is estimated that the following revenues will be available in the Debt Service Fund:

Transfer In from the Revenue Fund	$800,000

Section 3. That this resolution shall be entered in the minutes of the District within five (5) days after its adoption, copies thereof are ordered to be filed with the Finance and Budget Officer and Secretary of the Board as required by G. S. 159-13(d).

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PASSED AND ADOPTED this 17th day of May, 2023

M. Jerry VeHaun
Chairman of the Board

Attested to:

Jackie W. Bryson, Secretary/Treasurer

Metropolitan Sewerage District of Buncombe County
BOARD INFORMATIONAL ITEM

Meeting Date: May 17, 2023
Submitted By: Thomas E. Hartye, PE., General Manager
Prepared By: W. Scott Powell, CLGFO, Director of Finance
Cheryl Rice, Accounting Manager
Subject: Cash Commitment/Investment Report-Month Ended March 31, 2023

Background

Each month, staff presents to the Board an investment report for all monies in bank accounts and specific investment instruments. The total investments as of March 31, 2023 were $84,572,573. The detailed listing of accounts is available upon request. The average rate of return for all investments is 2.437% These investments comply with North Carolina General Statutes, Board written investment policies, and the District's Bond Order.

The attached investment report represents cash and cash equivalents as of March 31, 2023 do not reflect contractual commitments or encumbrances against said funds. Shown below are the total investments as of March 31, 2023 reduced by contractual commitments, bond funds, and District reserve funds. The balance available for future capital outlay is $45,504,656.

Total Cash & Investments as of 03/31/2023		84,572,573
Less:		
Budgeted Commitments (Required to pay remaining		
FY23 budgeted expenditures from unrestricted cash)		
Construction Funds	(15,804,724)	
Operations & Maintenance Fund	(7,039,294)	
		(22,844,018)
Bond Restricted Funds		
Bond Service (Funds held by trustee):		
Funds in Principal & Interest Accounts	(63,537)	
FY23 Principal & Interest Due	(7,089,384)	
		(7,152,921)
District Reserve Funds		
Fleet Replacement	(1,330,203)	
Pump Replacement	(201,403)	
WWTP Replacement	(356,158)	
Maintenance Reserve	(1,054,062)	
		(2,941,826)
District Insurance Funds		
General Liability	(544,830)	
Worker's Compensation	(498,475)	
Post-Retirement Benefit	(2,534,025)	
Self-Funded Employee Medical	(2,551,822)	
		(6,129,152)
Designated for Capital Outlay		45,504,656

Staff Recommendation
None - Information Only.

Action Taken
Motion by: to ☐Approve ☐Disapprove
Second by: ☐Table ☐Send to Committee
Other:
Follow-up required:
Person responsible: Deadline:

	Operating Checking Accounts	Gov't Advantage Money Market	NCCMT (Money Market)	Certificate of Deposit	Commercial Paper	Municipal Bonds	Cash Reserve	Gov't Agencies & Treasuries	Total
Held with Bond Trustee	$ -		$ 63,537			$ -	$ -		$ 63,537
Held by MSD	705,038	46,700	24,838,242	-	16,364,919	-		42,554,137	84,509,036
	$ 705,038	$ 46,700	$ 24,901,779	$ -	$16,364,919	$ -	$ -	$ 42,554,137	$ 84,572,573

Investment Policy Asset Allocation	Maximum Percent	Actual Percent	
U.S. Government Treasuries, Agencies and Instrumentalities	100%	50.32%	No significant changes in the investment portfolio as to makeup or total amount.
Bankers' Acceptances	20%	0.00%	
Certificates of Deposit	100%	0.00%	The District 's YTM of 4.62 % is exceeding the YTM benchmark of the
Commercial Paper	20%	19.35%	NCCMT Government Portfolio.
Municipal Bonds	100%	0.00%	
North Carolina Capital Management Trust	100%	29.44%	All funds invested in CD's, operating checking accounts, Gov't Advantage money market
Checking Accounts:	100%		are fully collaterlized with the State Treasurer.
Operating Checking Accounts		0.83%	
Gov't Advantage Money Market		0.06%	

Metropolitan Sewerage District
Investment Managers' Report
On March 31, 2023

Summary of Asset Transactions

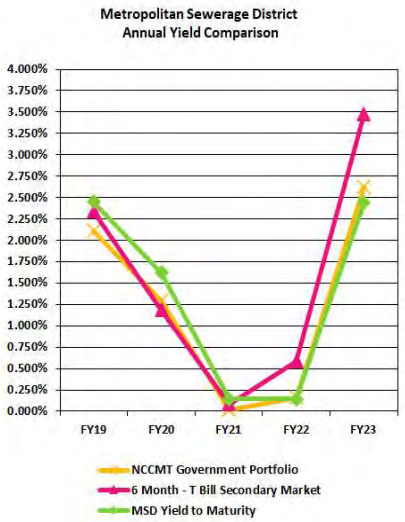
	Original Cost	Market	Interest Receivable
Beginning Balance	$ 75,562,698	$ 75,732,032	$ 195,843
Capital Contributed (Withdrawn)	1,778,251	1,778,251	
Realized Income	97,860	97,860	(62,066)
Unrealized/Accrued Income		55,946	100,356
Ending Balance	$ 77,438,809	$ 77,664,089	$ 234,133

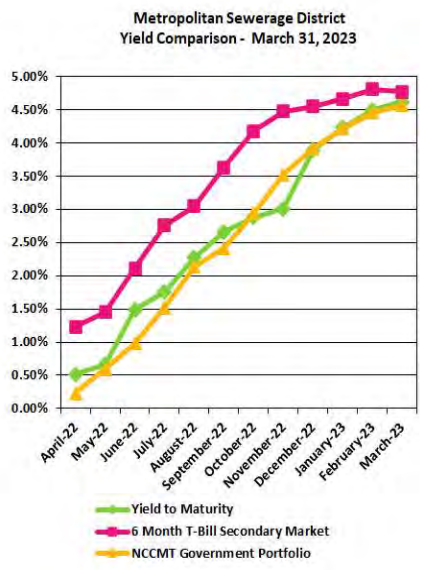
Value and Income by Maturity

	Original Cost	Income
Cash Equivalents <91 Days	$ 67,848,721	$ 168,307
Securities/CD's 91 to 365 Days	4,548,853	$ 11,284
Securities/CD's > 1 Year	5,041,236	$ 12,505
	$ 77,438,809	$ 192,096

Month End Portfolio Information

Weighted Average Maturity	95
Yield to Maturity	4.62%
6 Month T-Bill Secondary Market	4.77%
NCCMT Government Portfolio	4.57%

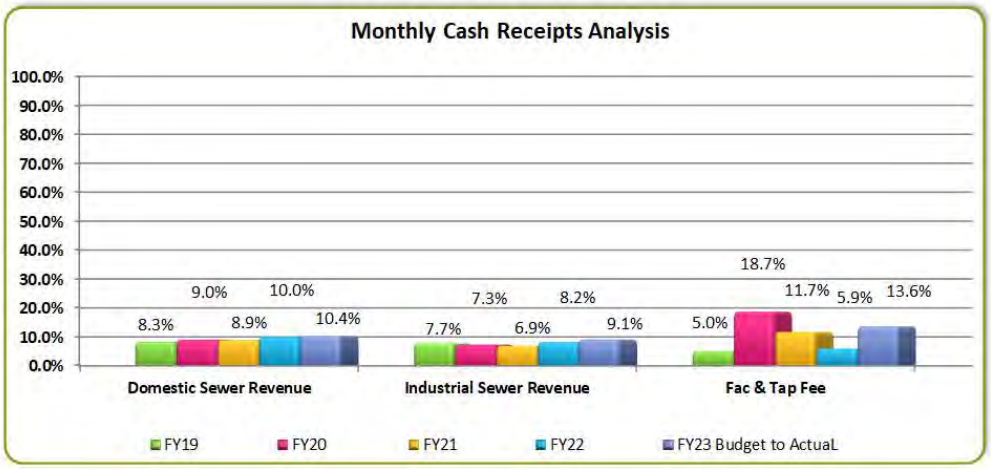




Metropolitan Sewerage District

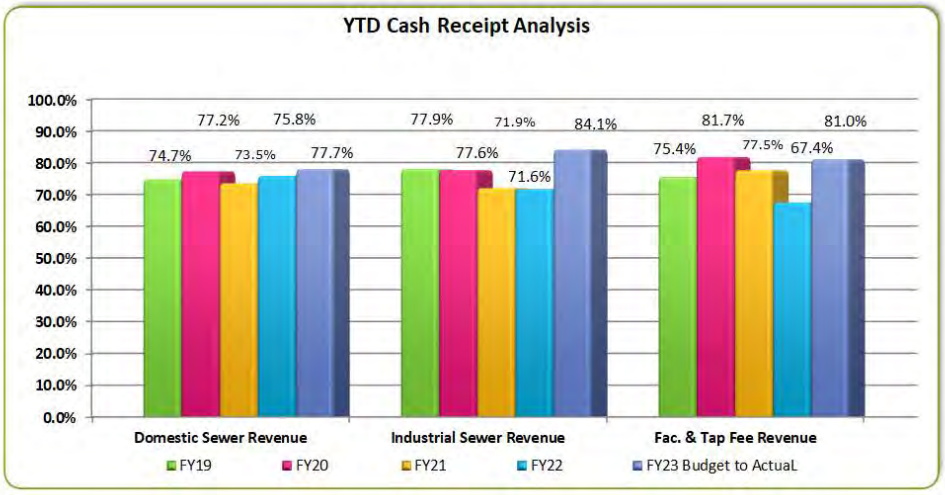
Analysis of Cash Receipts

As of March 31, 2023



Monthly Cash Receipts Analysis:

* Monthly domestic sewer revenue is considered reasonable based on timing of cash receipts in their respective fiscal periods.
* Monthly industrial sewer revenue is reasonable based on historical trends.
* Due to the unpredictable nature of facility and tap fee revenue, staff considers facility and tap fee revenue reasonable.



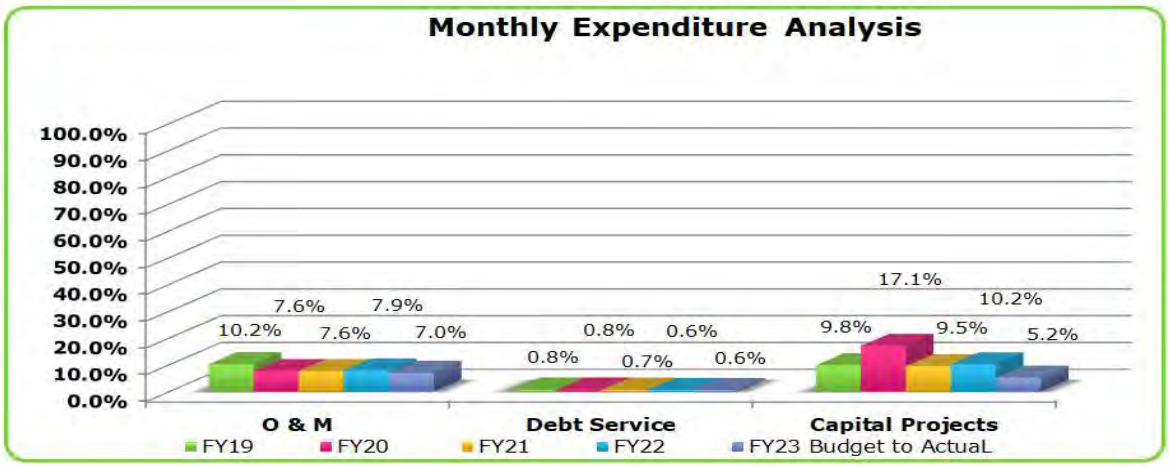
YTD Actual Revenue Analysis:

* YTD domestic sewer revenue is considered reasonable based on historical trends.
* YTD industrial sewer revenue is reasonable based on historical trends.
* Due to the unpredictable nature of facility and tap fee revenue, staff considers facility and tap fee revenue reasonable.

Metropolitan Sewerage District

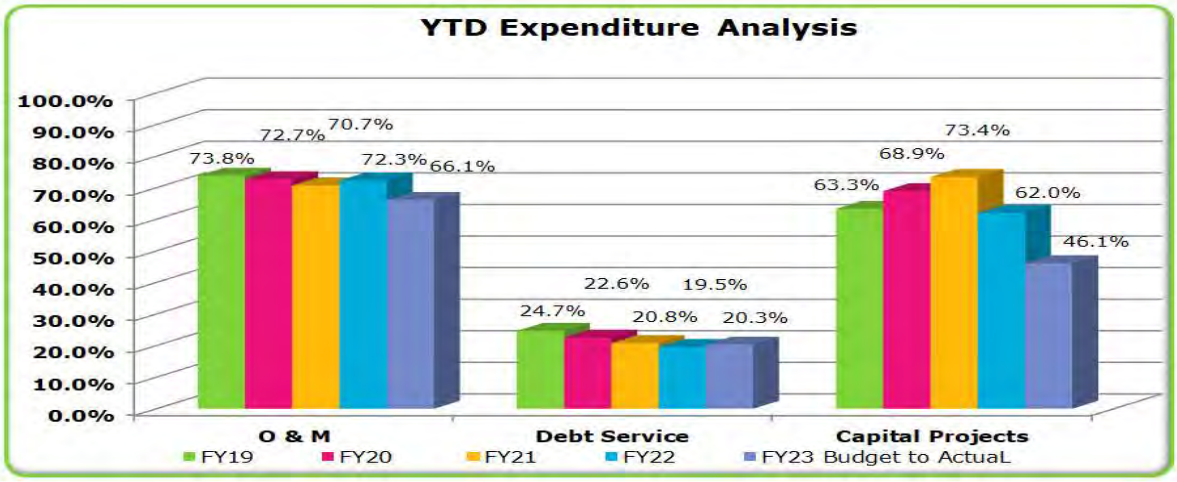
Analysis of Expenditures

As of March 31, 2023



Monthly Expenditure Analysis:

* Monthly O&M expenditures are considered reasonable based on historical trends and timing of expenditures in the current year.
* Due to the nature of the variable rate bond market, monthly expenditures can vary year to year. Based on current variable interest rates, monthly debt service expenditures are considered reasonable.
* Due to nature and timing of capital projects, monthly expenditures can vary from year to year. Based on the current outstanding capital projects, monthly capital project expenditures are considered reasonable.



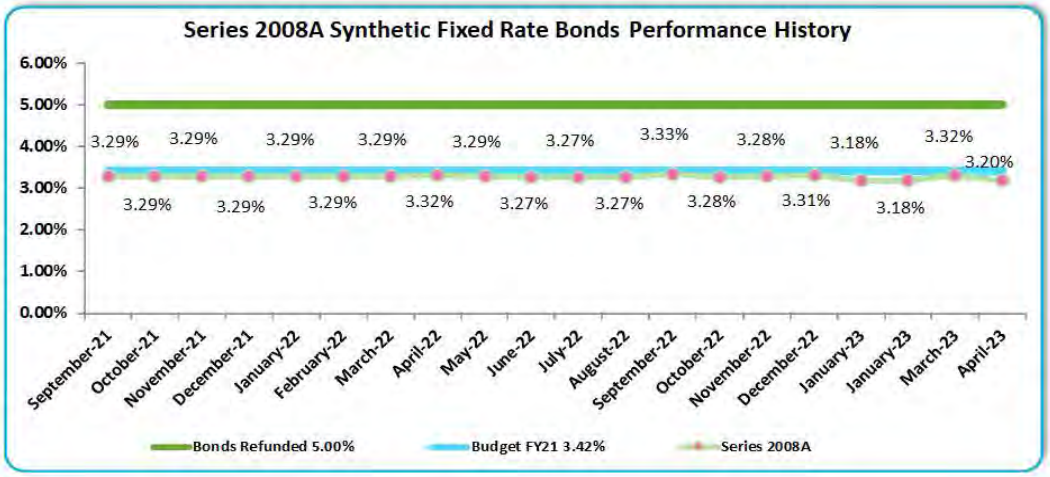
YTD Expenditure Analysis:

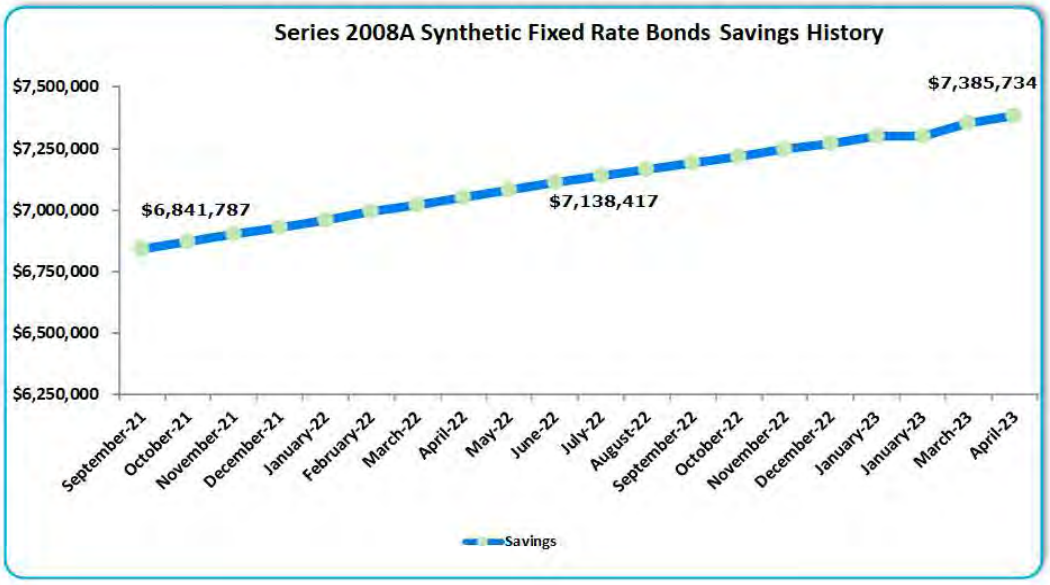
* YTD O&M expenditures are considered reasonable based on historical trends.
* Due to the nature of the variable rate bond market, YTD expenditures can vary year to year. Based on current variable interest rates, YTD debt service expenditures are considered reasonable.
* Due to nature and timing of capital projects, YTD expenditures can vary from year to year. Based on the current outstanding capital projects, YTD capital project expenditures are considered reasonable.

Metropolitan Sewerage District

Variable Debt Service Report

As of April 30, 2023





Series 2008A:

* Savings to date on the Series 2008A Synthetic Fixed Rate Bonds is $7,385,734 as compared to 4/1 fixed rate of 4.85%.
* Assuming the rate on the Series 2008A Bonds continues at the current all-in rate of 3.7210%, MSD will achieve cash savings of $4,670,000 over the life of the bonds.
* MSD would pay $406,969 to terminate the existing Bank of America Swap Agreement.

Metropolitan Sewerage District of Buncombe County
BOARD ACTION ITEM

Meeting Date:	May 17, 2023
Submitted By:	Thomas E. Hartye, PE., General Manager
Prepared By:	W. Scott Powell, CLGFO, Director of Finance
	Jody Germaine, Budget Analyst
Reviewed By:	Billy Clarke, Legal Counsel
Subject:	Consideration of the Resolution Adopting the Preliminary Budget for FY 2023-2024 and the Schedule of Sewer Rates & Fees

Background

The District Budget process must comply with North Carolina General Statues and the MSD Revenue Bond Order. The Bond order requires that the District adopt its final budget on or before June 15 of each year. The North Carolina General Statutes required that an annual balanced budget ordinance, based upon expected revenues, along with a budget message, to be presented to the governing board no later than June 1 of each year.

Staff/Committee Recommendations

BUDGET:

The Finance Committee unanimously approved staff's recommendation to forward to the Board for approval of the attached FY2023-2024 Preliminary Budget along with the Preliminary Budget Resolution.

SEWER RATES & FEES:

The Finance Committee unanimously approved staff's recommendation to forward to the Board for approval of the attached Proposed Schedule of Fees and Charges – FY2024.

Action Taken

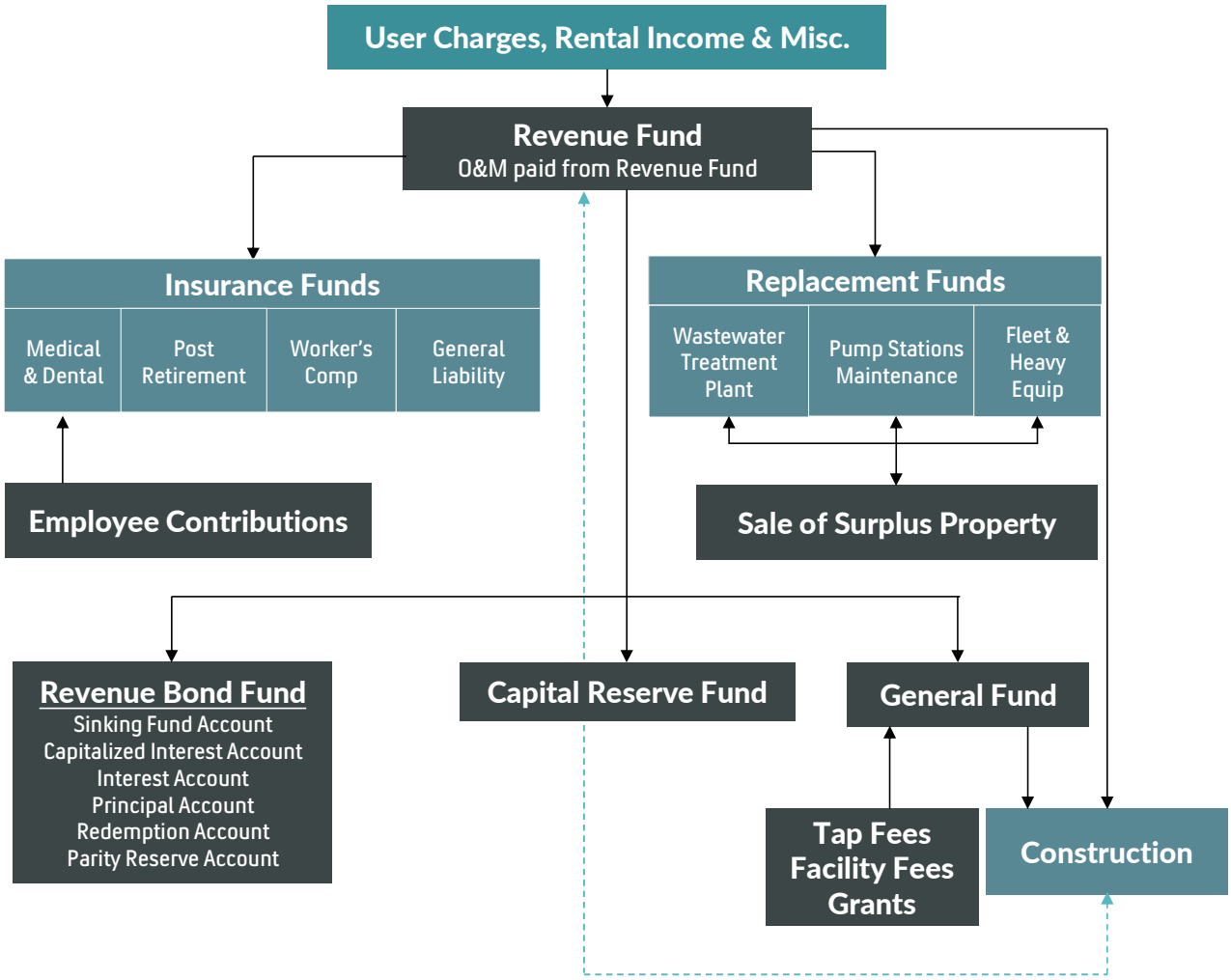
Motion by:	**to**	**Approve**	**Disapprove**
Second by:		**Table**	**Send to Committee**
Other:			
Follow-up Required:		**Person Required:**	**Deadline:**

Consolidated Budget Summary FY2024

	FY 2022 Actual Total	FY 2023 Amended Budget	FY 2024 Proposed Budget	Increase (Decrease)	% Change
REVENUES & FINANCING SOURCES					
Domestic User Fees	$ 36,661,486	$ 36,801,493	$ 38,928,326	$ 2,126,833	5.78%
Industrial User Fees	3,816,103	3,370,488	3,410,895	40,407	1.20%
Billing and Collection	1,021,457	1,019,478	1,157,474	137,996	13.54%
Facility and Tap Fees	5,966,012	3,175,000	3,200,000	25,000	0.79%
Interest and Misc. Income	276,338	1,145,536	2,902,076	1,756,540	153.34%
Rental Income	69,961	96,000	96,000	-	0.00%
City of Asheville (Enka Bonds)	29,274	35,000	35,000	-	0.00%
Employee Contributions to Health Fund	372,182	379,669	385,800	6,131	1.61%
Use of (Contributions to) Available Funds	(6,480,937)	14,029,434	6,454,394	(7,575,040)	-53.99%
Total Revenues & Financing Sources	$ 41,731,876	$ 60,052,098	$ 56,569,965	$ (3,482,133)	-5.80%
EXPENDITURES					
Operations and Maintenance	$ 16,531,916	$ 19,762,020	$ 20,862,488	$ 1,100,468	5.57%
Construction	14,994,227	30,314,882	26,377,993	(3,936,889)	-12.99%
Capital Equipment	652,082	1,075,835	594,817	(481,018)	-44.71%
Bond Principal and Interest	9,553,651	8,899,361	8,734,667	(164,694)	-1.85%
Other Long-Term Obligation	-	-	-	-	N/A
Total Expenditures	$ 41,731,876	$ 60,052,098	$ 56,569,965	$ (3,482,133)	-5.80%

NOTE: Both Operation and Maintenance and Capital Equipment expenditures represent actual amounts to be spent in the respective reserve funds. These amounts do not include current year reserve funds funding request.

Flow of Funds Chart



Priority of expenditures per Bond Order

1. Current Expenditures
2. Debt Service
3. Capital Reserve
4. Any Lawful Purpose

Income Sources

Trustee Funds

Expenditures

Flow of Funding

Flow of Funding if required for emergency repairs or maintenance

Budget Resolution

RESOLUTION ADOPTING PRELIMINARY BUDGET AND SEWER USE CHARGES
FOR THE
METROPOLITAN SEWERAGE DISTRICT
OF BUNCOMBE COUNTY, NORTH CAROLINA
FOR THE FISCAL YEAR July 1, 2023 THRU June 30, 2024

WHEREAS, the Board of Directors has reviewed the Operations and Maintenance, Bond, Reserves, Construction Expenditures of the District, and the sources of revenue and allocations (uses) of expenditures for the 2023-2024 fiscal year; and

NOW, THEREFORE, BE IT RESOLVED:

1 **The following amounts are hereby appropriated in the Revenue Fund for the Operations and Maintenance of the District and for transfers to the Debt Service, General Fund, and Insurance Funds for the fiscal year beginning July 1, 2023 and ending June 30, 2024:**

Operating and Maintenance Expenses	$	16,822,125
Transfer to Insurance Accounts	$	4,212,615
Transfer to Fleet & Heavy Equipment Fund	$	595,000
Transfer to Wastewater Treatment Plant Reserve	$	250,000
Transfer to Pump Station Maintenance	$	60,000
Subtotal O&M	$	21,939,740
Transfer to the General Fund	$	23,152,993
Transfer to Debt Service Fund	$	8,734,667
	$	53,827,400

It is estimated that the following revenues will be available in the Revenue Fund for the fiscal year beginning July 1, 2023 and ending June 30, 2024:

Domestic User Fees	$	38,928,326
Industrial User Fees	$	3,410,895
Billing and Collection Fees	$	1,157,474
Investment Interest	$	2,657,066
Reimbursement for Debt Service from COA	$	35,000
Rental Income	$	96,000
Appropriated from Net Position	$	7,542,639
	$	53,827,400

2 **The following amounts are hereby appropriated in the General Fund for the transfers to the Construction Fund for the fiscal year beginning July 1, 2023 and ending June 30, 2024:**

Transfer into Construction	$	26,377,993

It is estimated that the following revenues will be available in the General Fund for the fiscal year beginning July 1, 2023 and ending June 30, 2024:

Facility and Tap Fees	$	3,200,000
Investment Income	$	125
Transfer In from Revenue Fund	$	23,152,993
Appropriated from Net Position	$	24,875
	$	26,377,993

3 The following amounts are hereby appropriated in the Construction Fund for Capital Improvement Plan expenditures for the fiscal year beginning July 1, 2023 and ending June 30, 2024.

Capital Improvements Projects	$	26,377,993

It is estimated that the following revenues will be available to the Construction Fund for the fiscal year beginning July 1, 2023 and ending June 30, 2024.

Investment Income	$	500
Transfer In from General Fund	$	26,377,993
Contribution to Net Position	$	(500)
	$	26,377,993

4 The following amounts are presented as the financial plan of the Insurance Funds that are used to provide insurance services. Estimated operating expenditures for the fiscal year beginning July 1, 2023 and ending June 30, 2024 are:

Operating Expenditures	$	4,150,561

It is estimated that the following revenues will be available in the Insurance Funds for the fiscal year beginning July 1, 2023 and ending June 30, 2024:

Transfer In from the Revenue Fund	$	4,212,615
Investment Income	$	154,000
Employee/Retirees Medical Contributions	$	385,800
Contribution To Net Position	$	(601,854)
	$	4,150,561

5 The following amounts are presented as the financial plan of the Fleet & Heavy Equipment Fund designated for capital equipment expenditures for the fiscal year beginning July 1, 2023 and ending June 30, 2024 estimated as follows:

Transfer to Capital Reserve	$	-
Capital Equipment	$	193,619
	$	193,619

It is estimated that the following revenues will be available in the Fleet & Heavy Equipment Fund for the fiscal year beginning July 1, 2023 and ending June 30, 2024:

Transfer In from the Revenue Fund	$	595,000
Sale of Surplus Property	$	14,362
Investment Income	$	34,758
Contribution To Net Position	$	(450,501)
	$	193,619

6 The following amounts are presented as the financial plan of the Wastewater Treatment Plant Replacement Fund designated for wastewater treatment plant capital expenditures for the fiscal year beginning July 1, 2023 and ending June 30, 2024 estimated as follows:

Capital Equipment	$	217,000

It is estimated that the following revenues will be available in the Wastewater Treatment Plant Replacement Fund for the fiscal year beginning July 1, 2023 and ending June 30, 2024:

Transfer In from the Revenue Fund	$	250,000
Investment Income	$	6,905
Transfer Out to Pump Station Replacement Fund	$	-
Contribution To Net Position	$	(39,905)
	$	217,000

7 The following amounts are presented as the financial plan in the Pump Station Replacement Fund designated for pump capital expenditures for the fiscal year beginning July 1, 2023 and ending June 30, 2024 estimated as follows:

Capital Equipment	$	74,000
	$	74,000

It is estimated that the following revenues will be available in the Pump Station Replacement Fund for the fiscal year beginning July 1, 2023 and ending June 30, 2024:

Transfer In from the Revenue Fund	$	60,000
Investment Income	$	3,860
Appropriated from Net Position	$	10,140
	$	74,000

8 The following amounts are hereby appropriated in the Debt Service Fund for principal and interest payments for the fiscal year beginning July 1, 2023 and ending June 30, 2024:

Debt Service	$	8,734,667

It is estimated that the following revenues will be available in the Debt Service Fund for the fiscal year beginning July 1, 2023 and ending June 30, 2024:

Transfer In from the Revenue Fund	$	8,734,667
Investment Income	$	500
Transfer Out		
Contribution To Net Position	$	(500)
	$	8,734,667

9 That the Board of the Metropolitan Sewerage District does hereby approve an increase in the Budgets to the amount necessary to reflect any contributions to the Debt Service Reserve Fund or Capital Reserve Fund as determined by the Bond Trustee to be necessary to comply with covenants in the Bond Order.

10 The General Manager is hereby authorized to transfer appropriations as contained herein under the following conditions:

a. He may transfer amounts without limitation between departments in a fund.

b. He may transfer any amounts within Debt Service and Reserve Funds designated as excess by the Trustee into another fund.

c. He may transfer up to 10% of Insurance Fund reserves to meet current year expenditures in excess of budget.

11 That the attached Schedule of Fees and Charges be adopted as effective July 1, 2023.

12 That this resolution shall be entered in the minutes of the District and within five (5) days after its adoption, copies thereof are ordered to be filed with the Finance and Budget Officer and Secretary of the Board as required by G.S. 159-13 (d).

Adopted this 17th day of May 2023

M. Jerry VeHaun, Chairman
Metropolitan Sewerage District of
Buncombe County, North Carolina

Attest:

Jackie Bryson
Secretary/Treasurer

Metropolitan Sewerage District of Buncombe County, North Carolina
Schedule of Rates, Fees, and Charges - FY2024

Effective July 1, 2023

	ADOPTED FY2023 RATE	PROPOSED FY2024 RATE
Collection Treatment Charge		
Residential & Commercial Volume Charges (per CCF) Inside	$ 5.01	$ 5.26
Industrial Volume Charges (per CCF) Inside	5.01	5.26
Industrial Surcharge for BOD (per lb., BOD >250 mg/l) Inside	0.300	0.300
Industrial Surcharge for TSS (per lb., TSS >250 mg/l) Inside	0.250	0.250
Residential & Commercial Volume Charges (per CCF) Outside	$ 5.02	$ 5.27
Industrial Volume Charges (per CCF) Outside	5.02	5.27
Industrial Surcharge for BOD (per lb., BOD >250 mg/l) Outside	0.300	0.300
Industrial Surcharge for TSS (per lb., TSS >250 mg/l) Outside	0.250	0.250
Base Meter/Maintenance Charge & Billing Fee		
5/8"	$ 7.72	$ 8.11
3/4"	11.23	11.79
1"	19.94	20.94
1 1/2"	45.60	47.88
2"	80.65	84.68
3"	178.85	187.79
4"	319.16	335.12
6"	718.97	754.92
8"	1,276.60	1,340.43
10"	1,999.09	2,099.04
Billing Fee (per bill)	2.66	2.83
Sewer System Development Fees		
This impact fee is for alloted capacity in the treatment and transmission system. A differential fee will be charged for increases to an existing meter size.		
Residential		
Per Unit	$ 2,836.00	$ 3,568.00
Mobile Home	2,836.00	3,568.00
Multifamily Unit	1,900.00	2,390.00
Affordable Housing	670.00	844.00

Metropolitan Sewerage District of Buncombe County, North Carolina
Schedule of Rates, Fees, and Charges - FY2024

Effective July 1, 2023

	ADOPTED FY2023 RATE	PROPOSED FY2024 RATE
Sewer System Development Fees *(continued)*		
Nonresidential		
5/8"	$ 2,836.00	$ 3,568.00
3/4"	4,254.00	5,352.00
1"	7,090.00	8,919.00
1 1/2"	14,180.00	17,839.00
2"	22,688.00	28,542.00
3"	45,376.00	57,084.00
4"	70,900.00	89,194.00
6"	141,800.00	178,387.00
8"	226,800.00	285,319.00
10"	595,560.00	749,226.00
12"	751,540.00	945,452.00
Sewer Connection Fees		
The Sewer Connection Fee will apply to all new construction, as well as existing structures which have been demolished/rebuilt and sewer service is reinstated under new property ownership.		
MSD will install sewer connections where the public main is on the same side of the street as the residence or business		
MSD requires that a licensed utility contractor install any sewer connection/service line within public rights-of-way extending over 75 feet or that requires pavement disturbance or boring to reach across a paved thoroughfare. The installation shall be constructed to MSD Standards. All work will be subject to MSD inspection.		
Sewer Connection by MSD	$ 1,300.00	$ 1,300.00
Contractor installed Sewer Connection	Varies	Varies
Inspection Fee for Utility Contractor Installed Sewer Connection	$ 140.00	$ 140.00
Manhole Installation/Replacement		
Cost per foot	$ 250.00	$ 250.00
Pavement replacement (if required)	1,800.00	1,800.00

Metropolitan Sewerage District of Buncombe County, North Carolina
Schedule of Rates, Fees, and Charges - FY2024

Effective July 1, 2023

	ADOPTED FY2023 RATE	PROPOSED FY2024 RATE
Other Fees		
Allocation Fee	170.00	170.00
Non-Discharge Permit	200.00	200.00
Plan Review Fee	450.00	450.00
Plan re-review Fee	350.00	350.00
Pump Station Acceptance Fee	Note 1	Note 1
Note 1--See policy for details of computation of O&M and equipment replacement costs for upcoming 20 years; 50% discount for affordable housing.		
Bulk Charges		
Volume Charge for Septic Haulers (per 1,000 Gal.)	$ 45.00	$ 45.00
Biochemical Oxygen Demand >250 mg/l (per lb.)	0.300	0.300
Total Suspended Solids >250 mg/l (per lb.)	0.250	0.250
Returned Check Charge		
Returned Check (per event)	$ 25.00	$ 25.00
Dishonored Draft (per event)	25.00	25.00
Copy/Printing Fees/Miscellaneous (each)		
8x11 first print of standard GIS inquiry	$ 1.00	$ 1.00
8x14 first print of standard GIS inquiry	1.00	1.00
11x17 first print of standard GIS inquiry	2.00	2.00
24x36 first print of standard GIS inquiry	7.00	7.00
34x44 first print of standard GIS inquiry	12.00	12.00
36x48 first print of standard GIS inquiry	14.00	14.00
8x11 or 8x14 copies after first print	0.11	0.11
11x17 copies after first print	0.20	0.20
24x36 copies after first print	0.94	0.94
34x44 copies after first print	1.76	1.76
36x48 copies after first print	2.03	2.03
Foam Core mounting per sq. foot	3.00	3.00
Data CD	30.00	30.00
Shipping for CD	5.00	5.00
Permit Decals for Septic Haulers	50.00	50.00

STATUS REPORTS

MSD System Services In-House Construction
FY 2022-2023

PROJECT NAME	LOCATION	ZIP CODE	ESTIMATED FOOTAGE	ESTIMATED PROJECT DATES	WO#	CREW	COMPLETION DATE	ACTUAL FOOTAGE	NOTES
21 Mulberry Street Construction Rehabilitation	Woodfin	28804	465	7/8/22 - 7/22/22	289365	M. Hensley	**7/22/2022**	**465**	Construction Complete
Charlotte Street @ N Ridgeway Avenue	Blk Mountain	28711	1073	6/15/22 - 8/29/22	232699	Dockery	**7/26/2022**	**1233**	Construction Complete
122 Riverside Replacement	Asheville	28801	50	8/6/22 - 8/7/22	290174	Dockery	**8/7/2022**	**50**	Construction Complete
Owenby Lane @ US Highway 70 Sewer Rehabilitation	Black Mountain	28711	900	8/9/22 - 8/29/22	268180	Dockery	**8/29/2022**	**990**	Construction Complete
Cherry Street Sewer Rehabilitation	Weaverville	28787	420	9/6/22 - 10/1/22	278196	Dockery	**9/23/2022**	**435**	Construction Complete
S Main St @ Reems Creek Rd Sewer Rehabilitation	Weaverville	28787	592	10/3/22 - 11/15/22	275831	Dockery	**10/25/2022**	**592**	Construction Complete
Warren Haynes Drive Sag Removal	Asheville	28715	350	10/26/2022	291565	Cantrell	**10/26/2022**	**350**	Construction Complete
Albermarle Commons PS Elimination	Asheville	28805	625	10/31/22 - 12/9/22	284482	Dockery	**11/30/2022**	**627**	Construction Complete
Ash Line Repair	Woodfin	28804	8	15-Dec	292579	G. Hensley	**12/15/2022**	**8**	Construction Complete
Mountain View Rd at Maxwell Rd Sewer Rehabilitation	Asheville	28805	521	12/5/22 - 1/15/23	265289	Dockery	**12/30/2022**	**375**	Construction Complete
24 Woodgate Road Construction Rehabilitation	Asheville	28806	223	12/21/2022	292583	Cantrell	**12/21/2022**	**223**	Construction Complete
Wynn St. @ Mountain St. Sewer Rehabilitation	Asheville	28801	437	1/16/23 - 2/15/23	263129	Dockery	**1/25/2023**	**434**	Construction Complete
Bell Rd at New Haw Creek Rd Sewer Rehabilitation Phase 1	Asheville	28805	990	2/16/23 - 2/28/23	248044	McDevitt	**2/28/2023**	**987**	Construction Complete
Mace Avenue Sewer Relocation	Asheville	28806	100	3/7/23 - 3/20/23	293586	McDevitt	**3/21/2023**	**73**	Construction Complete
Bell Rd at New Haw Creek Rd Sewer Rehabilitation Phase 2	Asheville	28805	50	3/1/23 - 3/7/23	294564	McDevitt	**3/17/2023**	**67**	Construction Complete
Highland Farms Road Sewer Rehabilitation Phase I	Black Mountain	28711	850	4/10/23-5/10/23	275837	McDevitt	**4/25/2023**	**630**	Construction Complete
Georgia Street Replacement	Asheville	28806	175	4/26/23 - 5/3/23	295850	McDevitt	**5/1/2023**	**194**	Construction Complete
Highland Farms Road Sewer Rehabilitation Phase II	Black Mountain	28711	200	4/10/23-5/10/23	275837	McDevitt			Construction 20% complete
Grindstaff Dr @ McDowell St	Asheville	28803	603	5/11/23 - 6/1/23	284606	McDevitt			Ready for construction
Briarcliff Dr at Oakwilde Dr Construction Rehab Ph. 2	Asheville	28803	257	FY 22-23	285342	McDevitt			Ready for construction
Naples PS Elimination and Gravity Conversion Ph. 2	Cane Creek	28760	422	FY 22-23	285603	McDevitt			Ready for construction
Norwood Ave Sewer Rehabilitation	Asheville	28804	1022	FY 22-23	275810	TBA			Ready for construction
44 Galax Sewer Rehab	Asheville	28806	294	FY 22-23	280827	TBA			Ready for Construction
Northwest Avenue @ W Charleston Avenue	Swannanoa	28778	1031	FY 22-23	275849	TBA			Ready for construction
Old Fairview Rd @ Willington Road	Asheville	28803	732	FY 22-23	276005	TBA			Ready for construction
5 Golf Street	Asheville	28801	240	FY 22-23	284586	TBA			Ready for construction

CONSTRUCTION TOTALS BY DATE COMPLETED - Monthly

From 7/1/2022 to 3/31/2023

	Dig Ups	Emergency Dig Ups	Dig Up ML Ftg	Dig Up SL Ftg	Manhole Repairs	Taps Installed	ROW Ftg	IRS Rehab Ftg *	Const Rehab Ftg *	D-R Rehab Ftg *	Manhole Installs	Bursting Rehab Ftg *	Total Rehab Ftg *
July 2022	28	6	63	433	17	10	25,839	0	435	1233	7	30	1698
August 2022	30	6	70	904	14	27	14,647	0	0	1040	6	0	1040
September 2022	20	7	32	494	12	17	6,291	0	0	435	3	0	435
October 2022	15	5	46	507	16	29	3,940	0	350	592	7	0	942
November 2022	10	5	27	348	17	19	26,106	0	0	627	4	0	627
December 2022	12	9	31	320	10	50	0	0	223	383	4	0	606
January 2023	39	9	49	605	17	15	0	0	40	434	3	0	474
February 2023	39	12	90	719	15	18	720	0	0	987	11	0	987
March 2023	31	10	95	881	16	39	60	0	351	67	1	0	418
Grand Totals	**224**	**69**	**502**	**5,211**	**134**	**224**	**77,603**	**0**	**1399**	**5798**	**46**	**30**	**7227**

*** Used to calculate Total Rehab Footage**

CUSTOMER SERVICE REQUESTS

Monthly - All Crews

CREW	MONTH	JOBS	AVERAGE REPSONSE TIME	AVERAGE TIME SPENT
DAY 1ST RESPONDER				
	July, 2022	115	28	34
	August, 2022	83	30	37
	September, 2022	90	30	40
	October, 2022	83	29	36
	November, 2022	85	28	32
	December, 2022	71	27	50
	January, 2023	129	28	31
	February, 2023	152	28	30
	March, 2023	152	29	32
		960	**29**	**35**
NIGHT 1ST RESPONDER				
	July, 2022	41	25	19
	August, 2022	41	26	24
	September, 2022	35	35	26
	October, 2022	28	28	34
	November, 2022	34	41	38
	December, 2022	33	33	34
	January, 2023	69	33	22
	February, 2023	43	30	23
	March, 2023	44	33	28
		368	**31**	**26**
ON-CALL CREW *				
	July, 2022	29	40	39
	August, 2022	29	29	60
	September, 2022	27	56	67
	October, 2022	35	62	58
	November, 2022	28	49	51
	December, 2022	48	60	53
	January, 2023	60	67	33
	February, 2023	35	52	38

* On-Call Crew Hours: 8:00pm-7:30am (Jul. - Oct.) 11:30pm-7:30am (from Nov. onward) Monday-Friday, Weekends, and Holidays

CUSTOMER SERVICE REQUESTS
Monthly - All Crews

CREW	MONTH	JOBS	AVERAGE REPSONSE TIME	AVERAGE TIME SPENT
ON-CALL CREW *				
	March, 2023	34	55	32
		325	**54**	**46**
Grand Totals:		**1,653**	**34**	**35**

* On-Call Crew Hours: 8:00pm-7:30am (Jul. - Oct.) 11:30pm-7:30am (from Nov. onward) Monday-Friday, Weekends, and Holidays

PIPELINE MAINTENANCE TOTALS BY DATE COMPLETED - Monthly

July 01, 2022 to March 31, 2023

	Main Line Wash Footage	Service Line Wash Footage	Rod Line Footage	Cleaned Footage	CCTV Footage	Smoke Footage	SL-RAT Footage
2022							
July	100,862	4,736	1,390	102,252	14,226	50	1,886
August	95,363	1,583	0	95,363	29,701	0	6,165
September	51,254	1,193	1,816	53,070	21,909	0	5,747
October	60,901	1,089	5,221	66,122	24,032	493	10,894
November	15,578	1,676	1,365	16,943	17,617	450	16,220
December	30,535	1,598	2,136	32,671	8,109	0	26,472
2023							
January	46,850	2,797	3,209	50,059	13,499	0	25,849
February	64,673	1,804	4,788	69,461	14,134	225	21,635
March	120,867	1,255	3,216	124,083	34,382	2,835	25,210
Grand Total:	**586,883**	**17,731**	**23,141**	**610,024**	**177,609**	**4,053**	**140,078**
Avg Per Month:	**65,209**	**1,970**	**2,571**	**67,780**	**19,734**	**450**	**15,564**

CAPITAL IMPROVEMENT PROGRAM **STATUS REPORT SUMMARY** **May 10, 2023**

PROJECT	LOCATION OF PROJECT	CONTRACTOR	AWARD DATE	NOTICE TO PROCEED	ESTIMATED COMPLETION DATE	*CONTRACT AMOUNT	*COMPLETION STATUS (WORK)	COMMENTS
AURORA DRIVE	Asheville 28805	Terry Brothers Construction Co.	9/21/2022	9/29/2022	5/31/2023	$684,695.00	98%	Repaving complete. Final inspection being scheduled.
BENT TREE ROAD	Asheville 28804	Terry Brothers Construction Co.	11/19/2022	12/5/2022	5/31/2023	$980,781.00	98%	Repaving complete. Final inspection scheduled this week.
CALEDONIA ROAD	Asheville 28803	Hyatt Pipeline LLC	11/16/2022	1/23/2023	5/31/2023	$799,489.50	75%	Pipeline work nearing completion, repaving to be scheduled.
CHRISTIAN CREEK INTERCEPTOR	Buncombe County	Buckeye Bridge LLC	12/15/2021	3/14/2022	7/7/2023	$6,114,556.30	80%	Construction progressing well.
LE AN HURST ROAD	Asheville 28803	Terry Brothers Construction Co.	1/18/2023	3/21/2023	5/31/2023	$259,040.00	95%	Pipeline installation complete. Final inspection being scheduled.
LINING CONTRACT NO. 9	Buncombe County	Terry Brothers Construction Co.	1/18/2023	3/20/2023	3/14/2024	$2,262,890.00	5%	Pre-cleaning and pipe video work underway.
SPRINGSIDE ROAD @ OVERLOOK ROAD	Asheville 28803	Huntley Construction Company	5/19/2021	9/23/2021	5/31/2023	$942,301.82	99%	Final inspection scheduled for next week.
TOXAWAY STREET	Asheville 28806	Terry Brothers Construction Co.	7/20/2022	8/16/2022	5/31/2023	$329,485.00	99%	Paving warranty item being addressed.
WRF - EQUIPMENT STORAGE FACILITY	Woodfin	Cooper Construction Company	10/20/2021	3/28/2022	5/29/2023	$3,092,989.18	96%	Working on items needed for temporary C.O.
WRF - RBC SLIDE GATE REPLACEMENT PHASE 2	Woodfin	Harper Corp.	11/16/2022	3/27/2023	11/22/2023	$624,000.00	0%	No work has begun yet. Materials have been ordered.

***Updated to reflect approved Change Orders and Time Extensions**

Planning & Development Project Status Report

Active Construction Projects Sorted by Work Location and Project Number

May 5, 2023

No.	Project Name	Project Number	Work Location	Zip Code	Units	LF	Pre-Construction Conference Date	Comments
1	First Baptist Relocation	2015032	Asheville	28801	Comm.	333	7/21/2015	Final Inspection complete, awaiting close-out docs
2	Hounds Ear (Mears Ave Cottages)	2016123	Asheville	28806	18	402	8/18/2017	Pre-con held, construction not yet started
3	Ashecroft Ph. 2	2016229	Asheville	28806	40	2,450	2/20/2018	On hold
4	RADTIP	2017052	Asheville	28801	0	919	2/13/2018	Final Inspection complete, awaiting close-out docs
5	Lake Julian Crossing	2018271	Asheville	28704	Comm.	1,134	11/30/2022	Intalling
6	Timber Hollow Subdivision	2019049	Asheville	28805	18	525	7/28/2020	On hold
7	Millbrook Cottages	2019066	Asheville	28806	7	322	2/15/2022	Pre-con held, construction not yet started
8	3927 Sweeten Creek Rd (Rumi Way)	2019076	Asheville	28704	16	590	2/1/2023	Installing
9	UNC-A Edgewood Road Parking Lot	2019078	Asheville	28801	Comm.	373	7/19/2019	Final Inspection complete, awaiting close-out docs
10	Julian Woods Retirement Relocation	2019112	Asheville	28704	Comm.	1,083	3/17/2022	Installing
11	Ironwood Sewer Relocation	2019123	Asheville	28801	554	227	4/23/2021	Waiting on Testing
12	Burton Street	2021048	Asheville	28806	4	64	10/29/2021	Pre-con held, construction not yet started
13	Beloved Asheville	2021070	Asheville	28805	12	272	4/29/2022	Waiting on Testing
14	Busbee Ph. 1	2021245	Asheville	28803	210	4,245	4/26/2022	Installing
15	MAHEC Parking Deck	2021083	Asheville	28803	Comm.	550	6/1/2022	Waiting on final inspection
16	Old Home Road Subdivision	2021094	Asheville	28804	21	1,790	5/4/2022	Installing
17	Woodfield (RAD Lofts)	2021063	Asheville	28801	235	403	6/8/2022	Installing
18	Reed Creek Mixed Use	2022008	Asheville	28801	49	295	2/23/2023	Pre-con held, construction not yet started
19	Oak Hill Development	2022065	Asheville	288806	10	313	3/23/2023	Pre-con held, construction not yet started
20	Crossroads Community Ph1 Apartments	2022068	Asheville	28806	660	595	8/25/2022	Final Inspection complete, awaiting close-out docs
21	Waynesville Avenue Cottages	2021211	Asheville	28806	7	128	8/25/2022	Waiting on Paving
22	Reddick Road	2021108	Asheville	28805	5	507	9/2/2022	Pre-con held, construction not yet started
23	Randolph Avenue Commercial	2021149	Asheville	28806	Comm.	650	6/30/2022	Waiting on testing
24	The Ramble - Block K	2022015	Asheville	28803	38	4,516	1/25/2023	Installing
25	Friendly Hollow Way	2022064	Asheville	28803	5	166	1/25/2023	Waiting on final inspection
26	16/18 Spring Drive	2022125	Asheville	28806	2	70	4/18/2023	Installing
27	Jumbo Storage III	2022128	Asheville	28803	Comm.	283	11/9/2022	Final Inspection complete, awaiting close-out docs
28	Holiday Villa	2022172	Asheville	28704	7	355	2/15/2023	Waiting on final inspection
29	808 Montreat Road	2015126	Black Mountain	28711	4	371	4/18/2017	Final Inspection complete, awaiting close-out docs
30	Givens Highland Farms-Cottage Development	2018272	Black Mountain	28711	16	1,355	9/13/2019	Final Inspection complete, awaiting close-out docs
31	Sweet Birch Lane Phase 3	2020151	Black Mountain	28711	20	800	6/30/2021	Waiting on final inspection
32	Old Toll Road Subdivision	2020182	Black Mountain	28711	14	637	8/17/2021	Waiting on final inspection
33	Tudor Croft - Phase 2D	2018004	Black Mountain	28711	5	224	6/8/2022	Waiting on final inspection
34	NCDOT I-5504 NC 191/I-26 Interchange	2016132	Buncombe Co.	28806	0	355	10/23/2017	Installing
35	Liberty Oaks Ph. 1B	2018063	Buncombe Co.	28715	24	615	11/5/2021	Final Inspection complete, awaiting close-out docs
36	Upper Grassy Branch Road	2018087	Buncombe Co.	28805	6	250	8/31/2018	On Hold
37	Rockdale Subdivision	2018145	Buncombe Co.	28778	9	630	3/17/2020	Final Inspection complete, awaiting close-out docs
38	Roberson Relocation	2019037	Buncombe Co.	28715	Comm.	200	4/24/2020	Pre-con held, construction not yet started
39	Aiken Road Multi-Family	2019128	Buncombe Co.	28804	407	4,620	10/2/2020	Final Inspection complete, awaiting close-out docs
40	The Ramble - Tea House Ridge	2019159	Buncombe Co.	28803	22	8,050	9/21/2021	Installing
41	841 Charlotte Hwy	2019222	Buncombe Co.	28730	Comm.	110	4/20/2021	Pre-con held, construction not yet started
42	Creekside Cottages	2019255	Buncombe Co.	28704	6	400	3/12/2015	Phase 2 Construction Not started
43	Fisher Mill Road	2020015	Buncombe Co.	28704	3	380	10/20/2020	Final Inspection complete, awaiting close-out docs
44	Fountain Park Subdivision - Ph. 2	2020026	Buncombe Co.	28806	120	4,611	7/12/2019	Final Inspection complete, awaiting close-out docs
45	CMH Avery Creek	2020080	Buncombe Co.	28704	10	580	2/8/2022	Final Inspection complete, awaiting close-out docs
46	Kirkwood MHP (aka Rice MHP on-site)	2020166	Buncombe Co.	28715	75	2,610	12/21/2021	Final Inspection complete, awaiting close-out docs
47	Habitat- Glenn Bridge Road	2020178	Buncombe Co.	28704	30	908	12/14/2021	Final Inspection complete, awaiting close-out docs
48	Town Mountain Preserve Ph. 2	2020197	Buncombe Co.	28804	6	1,210	5/28/2021	Waiting on final inspection
49	Village at Bradley Branch Ph. 4B	2021120	Buncombe Co.	28704	16	393	11/2/2021	Waiting on final inspection
50	Schwan's Extension	2021261	Buncombe Co.	28715	Comm.	145	4/27/2023	Pre-con held, construction not yet started
51	Brooks Cove Road	2022045	Buncombe Co.	28715	141	2,357	5/3/2023	Pre-con held, construction not yet started
52	1102 New Salem Road	2022160	Buncombe Co.	28778	Comm.	569	12/15/2022	Final Inspection complete, awaiting close-out docs
53	Collett Industrial (Banner Farm)	2020108	Cane Creek	28759	Comm.	255	11/20/2020	Final Inspection complete, awaiting close-out docs
54	B&F Ceramics	2021143	Cane Creek	28759	Comm.	2,360	11/1/2022	Final Inspection complete, awaiting close-out docs
55	Tap Root Ph. 1	2020024	Fletcher	28732	198	8,397	4/29/2022	Installing
56	Fernleaf Charter School	2020177	Fletcher	28732	Comm.	780	3/25/2022	Waiting on final inspection
57	Suncap Warehouse	2021059	Fletcher	28732	Comm.	803	12/3/2021	Final Inspection complete, awaiting close-out docs
58	Heritage Park	2021275	Fletcher	28732	63	2,653	9/6/2022	Waiting on testing
59	Mills River Fire & Rescue HQ Station	2022058	Mills River	28759	Comm.	160	11/1/2022	Final Inspection complete, awaiting close-out docs
60	Palisades at Reems Creek	2020066	Weaverville	28787	132	1,020	3/24/2022	Installing
61	Union Chapel (Views at Reems Creek)	2021030	Weaverville	28787	11	650	8/2/2022	Final Inspection complete, awaiting close-out docs
62	Stoney Knob Commercial	2021102	Weaverville	28787	3	273	1/26/2023	Installing
63	18 Wildwood Park Sewer Relocation	2021129	Weaverville	28787	1	147	2/22/2022	Final Inspection complete, awaiting close-out docs
64	Crest Mountain Phase 3B	2013041	Woodfin	28806	69	1,329	10/15/2013	Final Inspection complete, awaiting close-out docs
65	Brown Avenue aka Wolf Tract	2017029	Woodfin	28806	6	219	6/4/2021	Waiting on Paving
66	Skyfin-Terraces at Reynolds Mtn - Phase 4	2020167	Woodfin	28804	5	100	8/8/2017	Final Inspection complete, awaiting close-out docs
67	Serenity Townhomes	2020037	Woodfin	28804	8	480	7/14/2020	Final Inspection complete, awaiting close-out docs
68	Weaverville Road Subdivision	2020123	Woodfin	28804	4	600	4/6/2021	On hold
69	Rydele Heights	2021098	Woodfin	28804	73	1,880	3/1/2023	Installing
			TOTAL		3,425	78,046		