

*South Essex
Sewerage District*



*Annual Report
2023*

Annual Report 2023



WELCOME

South Essex Sewerage District

Board Members

Michael R. Parsons, P.E. | *Chairman*

Michael P. Collins, P.E. | *Director of Engineering, City of Beverly*

Stephen M. King Jr., P.E. | *Representative of the Town of Danvers*

Amy S. McHugh | *Representative of the Town of Marblehead*

Robert J. Langley, P.E. | *Director of Engineering, City of Peabody*

Deborah L. Duhamel, P.E. | *City Engineer, City of Salem*

“It is the mission of the South Essex Sewerage District to protect the public health of the District’s residents and enhance the quality of the region’s water resources by providing safe, efficient and reliable wastewater collection, conveyance, treatment and disposal.

This mission is accomplished by an organization of people dedicated to professionalism, stewardship and quality that anticipates and responds to the changing environmental and economic needs of the communities and other entities it serves.”



Wastewater Treatment for
a Cleaner Environment

Annual Report

2023



A REPORT FROM OUR EXECUTIVE DIRECTOR

This South Essex Sewerage District (District) Annual Report for 2023 highlights some of the key efforts and activities that the District focused on last year. It also summarizes critical performance and financial metrics to provide information for our Member Communities and stakeholders.

In late September of 2023, a large diameter 50-year old critical conveyance pipe located underneath the Operations Building began to leak. It was quickly taken off-line, but the leak touched off a series of events to design, repair, and line the pipe (and three other pipes of similar size, materials, age, and operating conditions) under emergency procurement procedures, and coordinate with the Massachusetts State Revolving Loan Fund to provide an emergency \$4.4 million loan. Since September, this has been a major focus. Repairs to these four critical pipes will be completed in March 2024.

This emergency project highlights just how much infrastructure improvement and capital investment is needed to maintain a functional treatment system, elements of which are 30 to 100 years old. To address this reality, in September 2022, the District kicked off a Wastewater Facilities Management Plan to identify required plant improvements over the next twenty years. Concurrently, District staff are preparing a Financing Plan. Together, these comprise our SESD Centennial Plan, named in recognition of the 100-year anniversary of the Acts of 1925 that formed the District. This planning is critical to identify future District-wide needs and an approach to address them in an affordable manner.

The District is subject to Proposition 2 ½, and our budget increase each year is limited to 2 ½ percent. With recent significant price increases for treatment chemicals, residuals disposal, labor, and insurance, on top of the construction work we are undertaking as well as the emergency construction project noted above, there are real challenges in funding the ongoing operations and required upgrades within this 2 ½ percent limitation.

Another component of the work we are undertaking is that the District is placing additional emphasis on communicating with the public. It is important that the public knows the good work we are doing here and understand the need for a significant capital investment. The District hosted three Public Officials Open Houses last fall to this end and we are working to redesign our website.

In 2023, the District's Operations Department provided uninterrupted staffing and made the necessary process adjustments to maintain a high level of treatment performance. The District's Maintenance Department extended their use of our Computerized Maintenance Management System and increased their focus on Preventative Maintenance activities. The Administration and Technical Support Departments also continued their steady support of the District's enterprise.

In 2024, the goal is to complete the Centennial Plan and Finance Plan and to prepare a District Strategic Plan to focus and prioritize our efforts to sustain our operations. All of us at the District work hard to serve our Member Communities and protect Salem Harbor's water quality while positioning the District for a sustainable future.

A handwritten signature in blue ink, appearing to read "David Michelsen".

David Michelsen, P.E. | Executive Director

Annual Report

2023

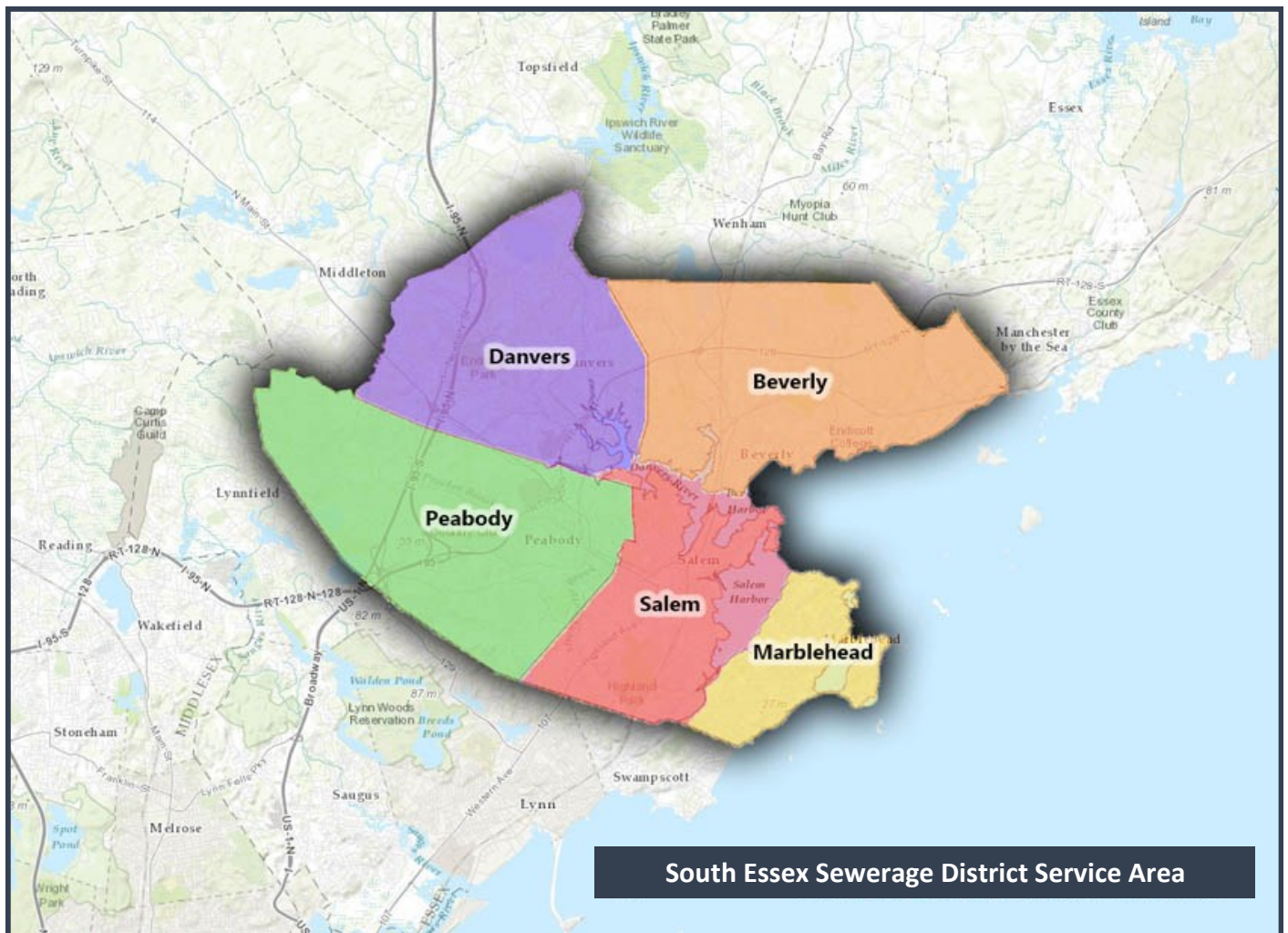


OUR HISTORY

SESD was established in 1925 to build, maintain, and operate a sewerage system for Beverly, Danvers, Peabody, Salem and the state and county institutions located in Danvers and Middleton, Massachusetts.

Since its establishment, services have expanded to include the town of Marblehead, as well as Gordon College in Wenham, and Ferncroft Village in Middleton.

The District is governed by a six-member Board representing our member communities who set policy and oversee the management of a staff of sixty employees.



South Essex Sewerage District Service Area

Annual Report

2023



COMMUNITY OUTREACH

We hope to further our Mission of water quality stewardship in ways that increase connection, understanding, and ultimately lead to changes in behavior that will help our water systems survive uncertain climate impacts ahead. With stormwater flooding and sewer overflows on the rise nationwide, it's more important than ever to understand how our plant and pump stations are connected to our homes and businesses — and the people who live, work, and play in our region.

In 2023, we hosted Public Officials Open Houses to assist local governmental representatives in understanding the importance of our plant operating 24-hours a day so our water is clean and safe in the environment around us.

Please, join us in conversation, too. It's a team effort to keep our waterways clean for all! Book a tour of our facility, invite us to your school, request an educational seminar and more online at www.sesd.com/contact-us/.

Mural to Raise Pollution Awareness

Our wastewater treatment plant is located on the Salem Harbor near Winter Island. Current campers from the island and Salem residents who own RVs may access our RV Disposal Station with an incredible ocean view on a seasonal basis.



A nearby rainwater-only storm drain provided a unique opportunity for education and outreach. On August 17, 2023, we partnered with Salem Sound Coastwatch, and their intern designed and painted the mural seen here. It says “Don’t Pollute!!!” with “Drains to Ocean” written in English, Spanish, Portuguese, and French. Mixing Salem’s classic witch city theme with environmental protection, we hope to prevent unauthorized dumping into the harbor. We sincerely thank the artist for her work, and thank Salem Sound Coastwatch for their partnership. We look forward to painting future murals!

ELECTED AND PUBLIC OFFICIALS OPEN HOUSES
 MONDAY, NOVEMBER 13, 2023, 6:30 PM
 TUESDAY, NOVEMBER 14, 2023, 6:30 PM
 WEDNESDAY, NOVEMBER 29, 2023, 2:30 PM

Please join the South Essex Sewerage Board and Management Personnel for a presentation about the South Essex Sewerage District at the District Administrative Offices located at 50 Fort Avenue in Salem at any of the three dates listed above.



AGENDA

Welcome, Introductions, and Opening Remarks	Michael Parsons, Board Chair
Overview of the South Essex Sewerage District	David Michelsen, Executive Director
What Do We Do Here?	Michael Wilson, District Engineer
Plant Photo and Virtual Tour	Michael Wilson, District Engineer
District Budget Process and Assessments	David Michelsen, Executive Director
Capital Program and Planning	David Michelsen, Executive Director
Final Remarks	Michael Parsons, Board Chair

ENGINEERING

The **Engineering Department** consists of three full-time positions including the District Engineer, Project Manager, and Environmental Health and Safety Manager. Engineering is responsible for providing technical support to the other divisions and overseeing the District’s engineering studies and capital projects.

In 2023 the Engineering staff were responsible for one emergency capital design and construction project, two capital upgrade construction projects, four studies, and one design project for a total of approximately \$8.8 million of new work under design and construction. Several of the projects are highlighted below.

Emergency Cured-in-Place Pipeline Repair Project

The 60-inch South Grit Effluent Pipe process pipe at the treatment plant failed in late September 2023 which required immediate repairs. The District completed an emergency investigation on the condition of the pipelines and began construction on a Cured-in-Place pipelining project for four large precast concrete cylinder pipes, which are critical to the treatment plant. The pipes were installed in the 1970’s. The pipelines will be lined with a structural liner.

An emergency change order was prepared for Contract 18-1 Primary Clarifier Concrete Restoration Project to add the lining work. Work on the repair is anticipated to be completed by the end of March 2024 at a cost of approximately \$4.4 million dollars. The project change is being funded with a loan from the Massachusetts State Revolving Fund program.



Asset Management Sustainability Program

The District is working on a multi-phase Asset Management Sustainability Program which has been ongoing since 2017. In 2023, the District completed a criticality and risk assessment of our assets. The criticality and risk scores were input into the District’s Asset Management Software which prioritizes the importance of each asset (such as pumps), to determine a ranking for operations and maintenance activities. Work on this project continues including Operator Driven Reliability training. The District received a \$112,500 matching grant from the Massachusetts State Revolving Fund to complete this work.

ENGINEERING

Contract No. 18-1: Primary Clarifier Concrete Restoration

This project has been underway since June 2021. The District awarded this contract to Methuen Construction Company, Inc. The project is anticipated to be completed in late 2024. The purpose of the project is to remove deteriorated concrete above the water line within the 50-year-old tanks and influent and effluent channels and restore the concrete with a protective mortar product and epoxy coating to protect the tank from further hydrogen sulfide corrosion. In addition to the concrete work, the sludge collection system will be refurbished, which will improve long-term operational reliability. At the close of 2023, four of the seven primary clarifiers are complete and have been re-commissioned. This project is funded by a loan from the Massachusetts State Revolving Fund program. The overall cost of these capital improvements will be approximately \$15 million dollars.

Wastewater Facilities Management Plan

The District contracted with an engineering company to prepare a 20-year capital needs and wastewater facilities plan for the treatment plant and remote pumping stations. The purpose of this Wastewater Facilities Management Plan is to establish a road map for the District's capital spending and facilities upgrade activities for the next 20-year planning cycle. The overall goals of the plan include an assessment of the District's assets and facilities; assessment of treatment processes, residuals management, and odor control practices now and in the future; and an assessment of impacts from climate change. An alternatives analysis will be completed and recommendations for improvements at the wastewater treatment plant and remote pumping stations will be prioritized. The recommendations will be incorporated into a multi-phased capital improvements plan. The study should be completed in 2024.



Contract 23-1 Danvers Standby Generator Replacement Project

The District is working with an engineering company to design the replacement of the Danvers standby generator at the Doty Avenue Pumping Station. The purpose of the project is to replace an existing standby generator that has reached the end of its useful life. The project includes the design, permitting, and construction services for a new standby diesel generator in an enclosure outside the pumping station and an automatic transfer switch inside. The design and permitting is completed and the project is anticipated to go to bid in Spring 2024.

Annual Report

2023



LABORATORY & MONITORING/ENFORCEMENT

The **Laboratory and Monitoring/Enforcement Department** consists of six full-time positions: Supervisor, Industrial Pre-Treatment Inspector, Pre-Treatment Technician, Chief Lab Technician, Senior Lab Analyst, and Lab Technician. *Laboratory* personnel collect samples throughout the plant and receive samples from the *Operations* and *Monitoring/Enforcement* departments. Analyzed results are used to control the treatment process and to verify that the plant is performing to meet our Federal and State discharge permit requirements and assure our discharge does not negatively impact the water quality of Salem Sound.

Industrial Users

The District permits twenty-seven Industrial users: 21 Significant Industrial Users or SIUs, and 6 General Permitted Industries who are required to comply with our pre-treatment guidelines. Personnel in the *Monitoring/Enforcement* Division inspect and enforce restrictions on all wastewater dischargers in our service area. We currently maintain 500 industries in our database.

During the calendar year 2023, 520 Industrial inspections were conducted. There were 108 miscellaneous industries inspected, consisting of five year inspections, permit renewals, new industries, as well as 391 pH spot checks, and 21 SIU annual inspections.

In August 2022, the District submitted an updated Local Limits Report and Sewer Use Regulations to the EPA. An informational session was held in February 2023 to discuss changes in the proposed new Sewer Use Regulations. After incorporating public comments, EPA and the District Board approved the new Sewer Use Regulations and Local Limits in May 2023. New pretreatment permits incorporate the updated Regulations as of October 2023.

Testing Performed in 2023

Description	Estimated # of Tests
1. pH	3,800
2. Settleable Solids <i>(Three locations in plant)</i>	1,000
3. Settled Sludge Volume <i>(Aeration Tanks)</i>	800
4. Dissolved Oxygen	1,200
5. Temperature	500
6. Chlorine Residual <i>(Three locations in plant)</i>	2,200
7. Bacteria <i>(Fecal Coliform, Enterococci)</i>	3,650
8. Total Solids <i>(Process grab samples)</i>	1,300
9. Total Suspended Solids <i>(Process grab samples)</i>	2,400
10. Total Suspended Solids <i>(Community, Process & Industry samples)</i>	2,400
11. Biochemical Oxygen Demand <i>(Community, Process & Industry samples)</i>	2,000

Annual Report

2023



OPERATIONS

Permit Driven, Quality Delivered

The District's effluent discharge is governed by a permit issued by the USEPA under the Clean Water Act (CWA) known as a National Pollutant Discharge Elimination System permit (NPDES).

The permit contains limits on the quantity and quality of the water the District can discharge, monitoring and reporting requirements, and other provisions to ensure that the discharge does not impair water quality or people's health. It essentially provides a standard for how the District should operate to maintain a safe discharge to protect the water quality of Salem Sound.

The **Operations Division** consists of twenty-four full-time positions:

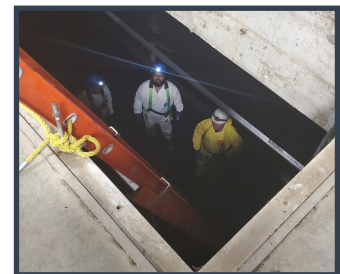
- Superintendent of Operations
- Assistant Superintendent of Operations
- 6 Chief Operators
- 12 Operators
- 4 Facilities Attendants

The staff ensure 24-hour, 365 days of safe operation of our secure wastewater treatment facility.

45.5 inches of rain fell in 2023, resulting in a higher than average total wastewater flow. The District treated 10.3 billion gallons of flow, an average of 28.2 million gallons of flow per day. That's almost 2 billion gallons more than last year!

Plant Performance Report - 2023

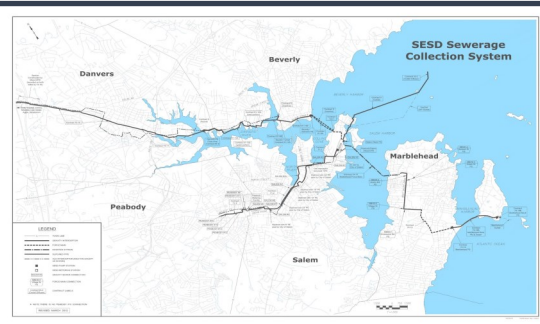
Influent TSS	190 mg/l	Average Per Day
Influent BOD	145 mg/l	Average Per Day
Effluent TSS	17 mg/l	Average Per Day
Effluent BOD	11 mg/l	Average Per Day
Effluent Flow	28.2	Million Gallons Per Day
Effluent Flow	10.3	Billion Gallons in 2023
Fecal Coliform	16 CFU / 100 ml	Average Per Day
Enterococci	16 Colonies / 100 ml	Average Per Day
Chlorine Residual	0.02 mg/l	Average Per Day
Sludge Daily	82 Tons	Average Per Day
Sludge Total	29,748	Tons in 2023



MAINTENANCE

The **Maintenance Division** consists of twenty-two full-time positions:

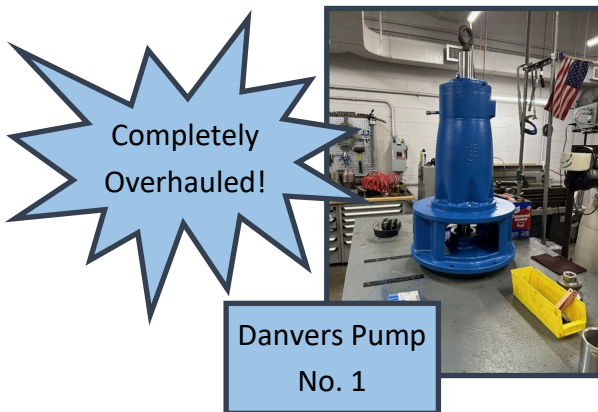
- Superintendent of Maintenance
- Asst. Superintendent of Maintenance
- Scheduler, Planner, CMMS Administrator
- 2 Instrumentation/Electrical Specialists
- Lead Instrumentation/Electrical Technician
- Instrumentation/Electrical Technician
- Inventory Control Clerk
- Facilities Foreman
- HVAC Mechanical Technician
- Master Mechanic
- 3 Lead Mechanics
- 3 Mechanics
- Mechanic/Machinist
- Mechanic/Equipment Operator
- Mechanic Helper
- Maintenance Equipment Operator
- Maintenance Helper



Notable Accomplishments

These projects were completed using our own labor force, resulting in significant cost savings for the District.

- Completed a complete overhaul of the Danvers No. 1 and No. 3 Sewage Pumps.
- Overhauled 18" non-rising Stem Cast Iron Valve from Danvers Pump Station Metering Vault.
- Purchased and installed new Variable Frequency Drives (VFDs) for the Danvers Pump Station No. 2 and No. 3 Sewage Pumps.
- Purchased and installed new VFDs for Peabody/Salem Influent Pump Station No. 3 and No. 4 Sewage Pumps.
- Purchased and installed new Effluent Pump Station controls and Wet Well Radar Sensors.
- Designed, purchased, and installed two new Air Handling Units for the Switch Gear No. 5 Room.
- Refurbished Primary Settling Tank Mechanical Equipment in conjunction with the Primary Clarifier Concrete Restoration Project.
- Purchased and installed new chemical feed pumps for Odor A & B Systems.
- Purchased and installed improved VFDs for Odor System chemical feed pumps.
- Removed and refurbished several 480 volt breakers from District Switch Gear as part of an ongoing District-wide electrical maintenance program.



Annual Report 2023



ADMINISTRATION & FINANCE

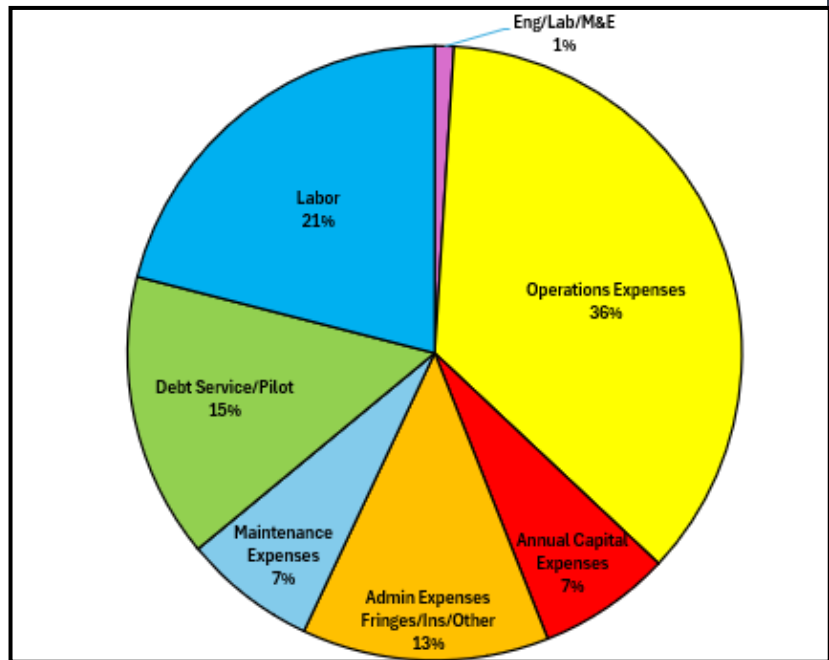
The Division consists of four full-time positions and one part-time position:

- Executive Director
- Manager of Administration and Finance (District Treasurer)
- Executive Assistant/Outreach Coordinator
- Staff Accountant (District Clerk)
- Part-Time Accounting Assistant

The District's **Administration and Finance Division** is responsible for the administration, finance and overall operational direction of the District. The division formulates and administers policies and procedures concerning all District functions. It also prepares the annual budget and member entity assessments based on their portion of flows and loads to the

District's treatment plant. The District Board is responsible for reviewing and approving each fiscal year budget. A complete review of the District's fiscal year financial performance may be found in the District's Audited Financial Statements and Treasurer's Report. Some FY 2023 highlights include:

- Assets exceeded liabilities by \$173.2 million representing a decrease of \$2.5 million from FY 2022. The largest portion of the net position, \$173.5 million, reflects the District's investment in capital assets (excluding debt), such as the treatment plant.
- From FY 2011 through FY 2024, the District appropriated \$19.95 million for the Capital Improvement Program as part of its annual budgets.
- FY 2023, member community assessments totaled \$26,147,567 representing an increase of 1.84% from the FY 2022 budgeted amount of \$25,675,485.
- The Operations Division accounts for the majority of the fiscal operating budget as it is responsible for power, fuel, chemical, and residuals disposal expenditures.



South Essex Sewerage District

P.O. Box 989 | 50 Fort Avenue

Salem, MA 01970

(978)744-4550

www.sesd.com

Annual Report - 2023