



Water Conservation and Energy Efficiency at Seagate

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Driven to DiscoverSM

Seagate Technology

- **Produces data storage devices**
 - External Hard Drives, SSDs
- **Normandale Facility**
 - Bloomington, MN
 - 733,108 sq ft
 - 1,100 employees
 - R&D and semiconductor wafer manufacturing



S E A G A T E

Incentive to Change

- **Integrity, Innovation, and Inclusion**
- **Environmental Stewardship**
 - Advance sustainable solutions
 - Reduce carbon footprint
 - Provide transparent metrics and goals
- **Seagate Goals**
 - Improve water recycling and reduce consumption
 - Reduce energy use and GHG emissions
 - Minimize waste disposal

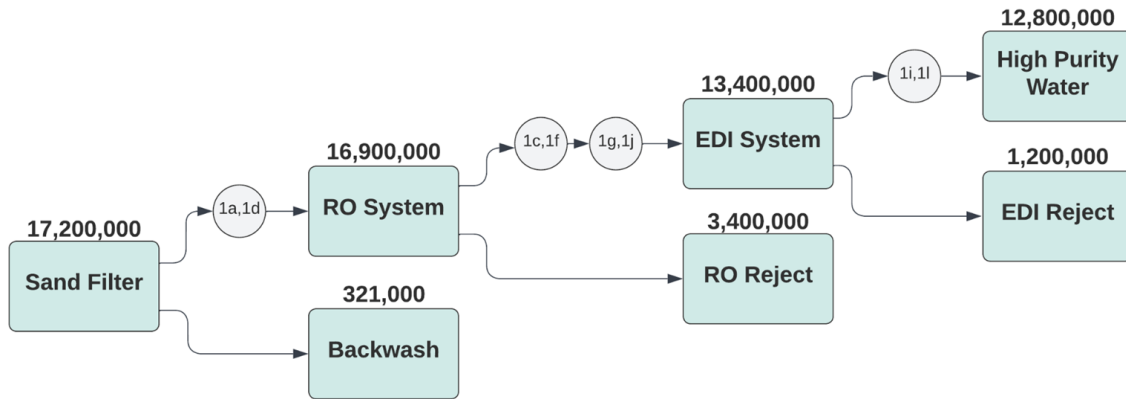


Approach

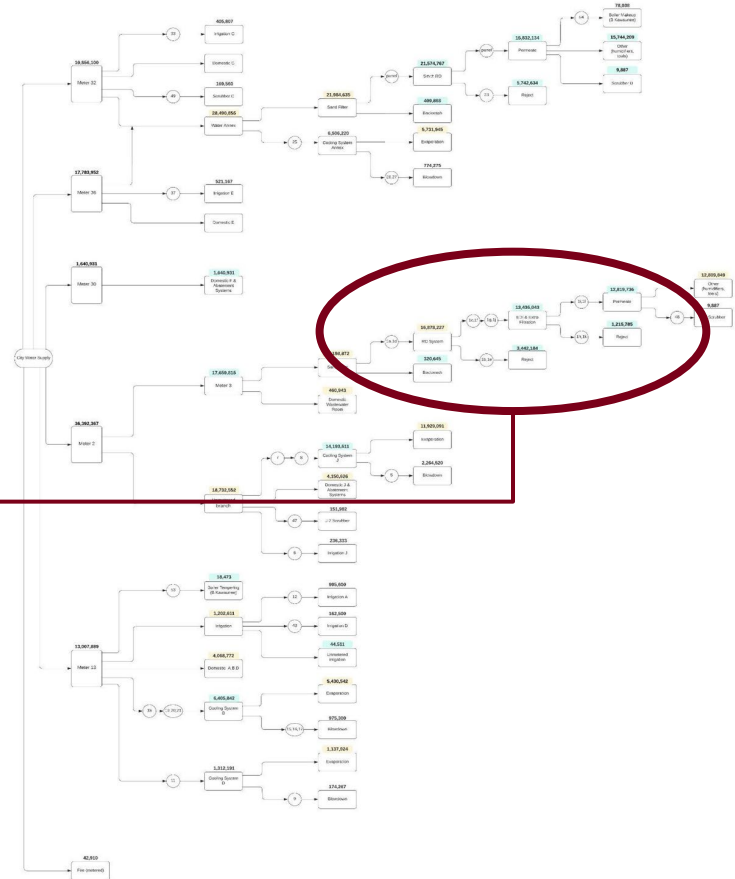
- **Water Mapping**
 - Collected consumption data
 - Quantified largest water use
 - Crafted water map
- **High Purity Water**
 - Largest water use category
 - Important for facility and process



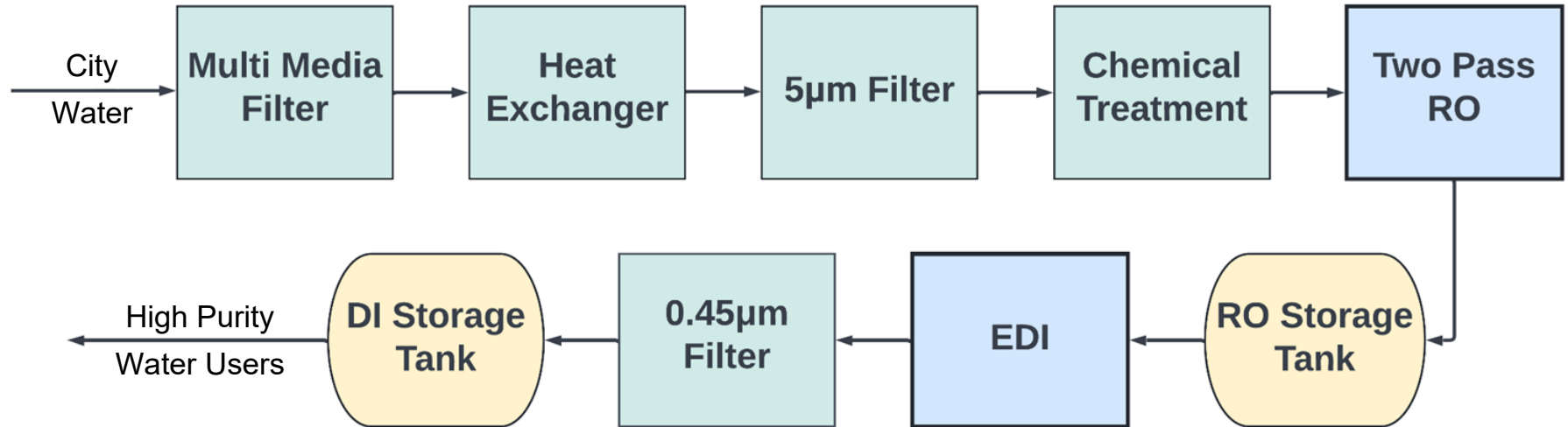
Water Map



*Average gallons per year



High Purity Water System



Chemical Analysis

	Total Cl	Ca	Mg	Silica	Hardness	TDS	pH	Cond.
	mg/L	ug/L	ug/L	ug/L	ug/L	mg/L		uS/cm
City Water	1.6	11,300	16,900	9,740	97,800	130	8.9	218
RO Reject	<0.1	59,100	85,200	52,200	498,000	701	8.1	1,070
EDI Reject	<0.1	206	52.5	<214	732	<10	6.9	5.5

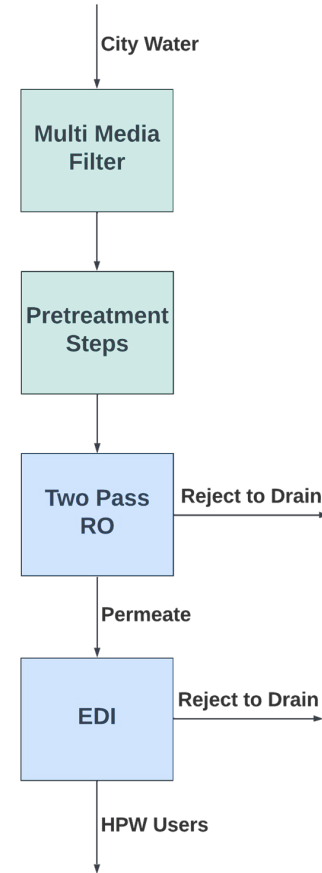
Frequency and Flow

RO Reject Trend		Average	SD
Flow rate	gpm	13.7	0.6
Time running	min	87	19
Time btw Off/On	min	74	19
Frequency	min	160	25

EDI Reject Trend		Average	SD
Flow rate	gpm	9.7	0.5
Time running	min	41	2
Time btw Off/On	min	103	8
Frequency	min	144	7

Solutions

- **Current Situation**
 - EDI reject “cleaner” than city water
 - Consistent frequency and flow relationship
 - Proximity of systems
- **Proposed Solutions**
 - Recycle EDI Reject through HPW system
 - Reuse RO Reject for Irrigation



Solutions

- **Flow Path**

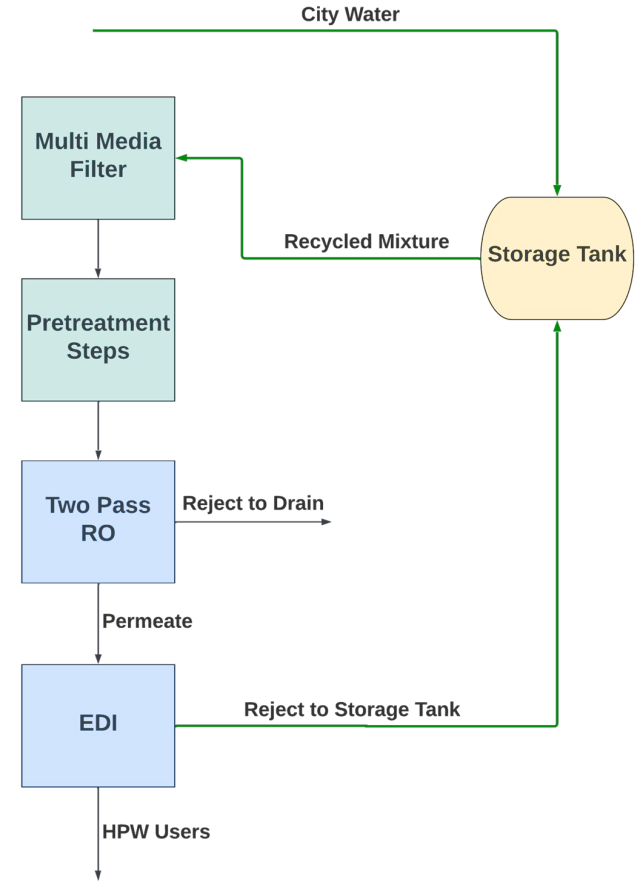
- Combine reject with incoming city water
 - 13% reject, 87% city
 - 3,000 gallon storage tank
- Pump into multimedia filter

- **Feed Composition**

- Lower concentration of contaminants
- Negligible pH change

- **Annual Savings**

- 1.5 million gallons of water
- \$14,130 in sewer and usage costs
- Decrease in chemicals for pretreatment



Solutions

Recommendation	Annual reduction	Total cost	Annual savings	Payback period	Status
EDI Reject in HPW System	1,500,000 gal water	TBD	\$14,000	TBD	Recommended
RO Reject for Irrigation	1,200,000 gal water	TBD	\$11,000	TBD	Recommended
LED Fixture Upgrade	1,700,000 kWh	\$322,000	\$114,000	2.8 years	Recommended

Personal Benefits

- Gained new technical skills
- Improved leadership and problem solving skills
- Learned about industry conservation efforts
- Worked with amazing individuals
 - Special thanks to:
 - MnTAP staff
 - Facilities/EHS team
 - Fellow interns

