



# New York City's Water Challenge to Universities

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College Water Efficiency Group  
January 16, 2020

1. About DEP and Water Conservation in New York City
2. Water Challenge to Universities Program
3. Case Study: Weill Cornell Medicine
4. Questions

*New York City Department of Environmental Protection (DEP) is the largest combined water and wastewater utility in the United States, with 6,000 employees and an annual budget of more than \$1 billion.*

## **WATER SUPPLY**

- Deliver nearly 1 billion gallons of water to 9 million New Yorkers every day and maintain 7,000 miles of water mains
- Protect approximately 2,000 square miles of watershed, including 19 reservoirs and three controlled lakes

## **WASTEWATER TREATMENT**

- Treat almost 1.3 billion gallons of wastewater each day
- Operate and maintain 14 plants, 96 pumping stations, and over 7,500 miles of sewers

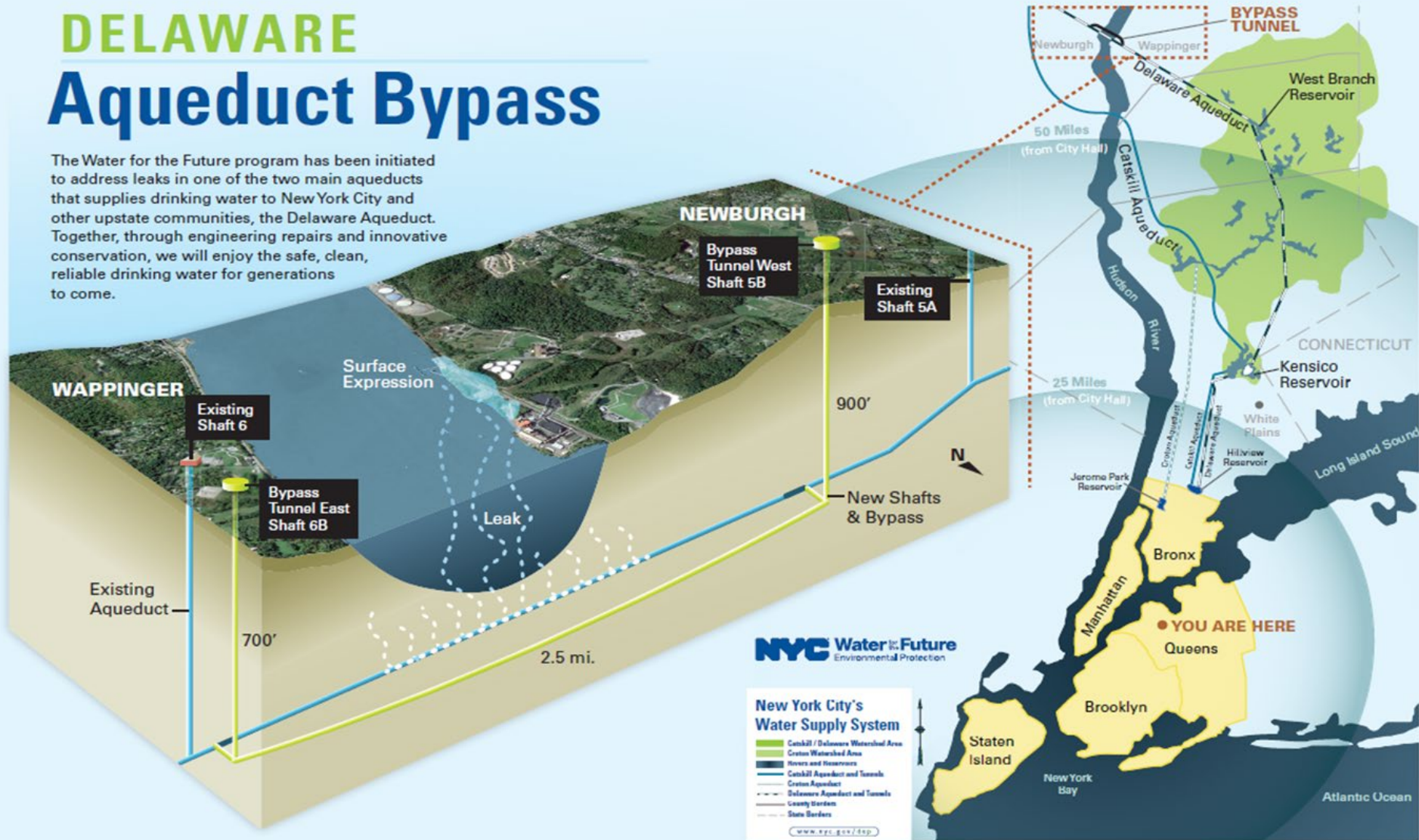
## **AIR, NOISE, AND HAZARDOUS WASTE**

- Enforce the NYC Air Pollution Control Code to reduce local emissions, enforce the NYC Noise Code, and regulate hazardous waste



## DELAWARE Aqueduct Bypass

The Water for the Future program has been initiated to address leaks in one of the two main aqueducts that supplies drinking water to New York City and other upstate communities, the Delaware Aqueduct. Together, through engineering repairs and innovative conservation, we will enjoy the safe, clean, reliable drinking water for generations to come.



# DEP's Water Demand Management Program

DEP's Water Demand Management Program has reduced NYC's demand by over 10 MGD since 2013, with an additional 10 MGD planned by 2022.



## One Water NYC: 2018 Water Demand Management Plan



Bill de Blasio  
Mayor  
Vincent Sapienza, P.E.  
Commissioner



**Municipal:** Retrofit and replace water fixtures in public facilities



**Residential:** Replace inefficient fixtures in multi-family buildings



**Non-Residential:** Create voluntary conservation programs (Water Challenges) and provide cost sharing incentives



**System Optimization:** Continue leak detection, pressure management, and metering



**Water Supply Management:** Revise Water Shortage Emergency Rules



**Wholesale Customers:** Develop and implement demand management plans for largest wholesale customers, tailored to their individual water systems

# Vision: Sector-Specific Water Challenges

The goal of the New York City Water Challenge Program is to help Non-Residential water users achieve and sustain long-term water savings.

Hotel Challenge 2013  
 10 participants  
 4 winners



30,000 gallons/day   
 11,000,000 gallons/year

Restaurant Challenge 2014  
 15 participants  
 8 winners

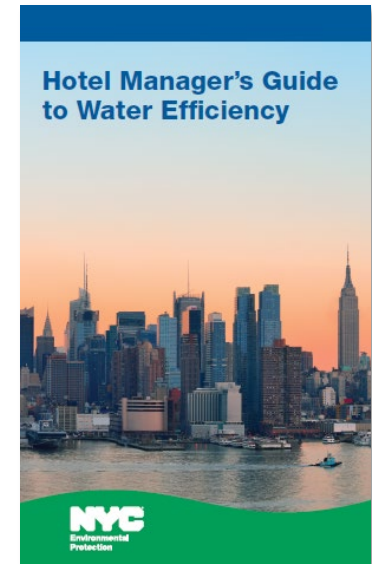


26,000 gallons/day   
 9,000,000 gallons/year

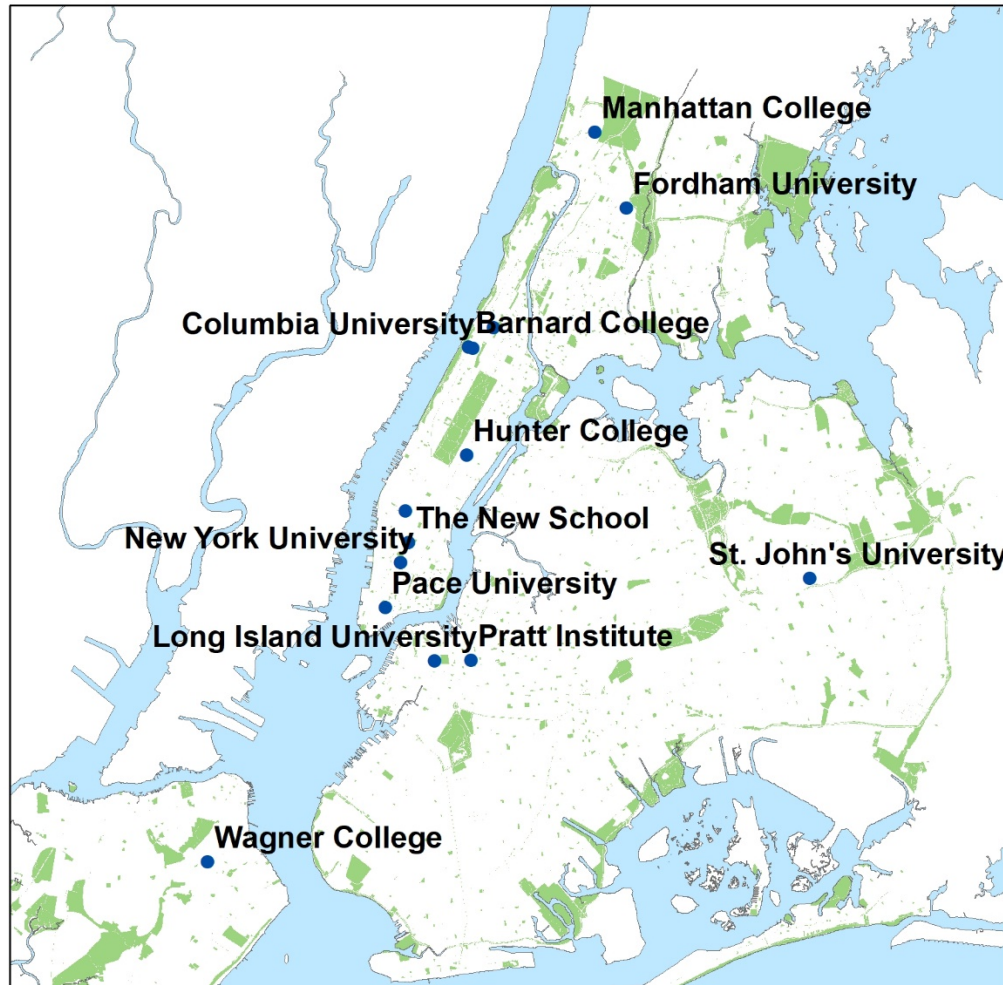
Hospital Challenge 2016 - 2017  
 3 participants  
 1 winner



35,000 gallons/day   
 13,000,000 gallons/year



NYC's largest universities use at least **2,300,000 gallons per day**



*Largest Universities in NYC*

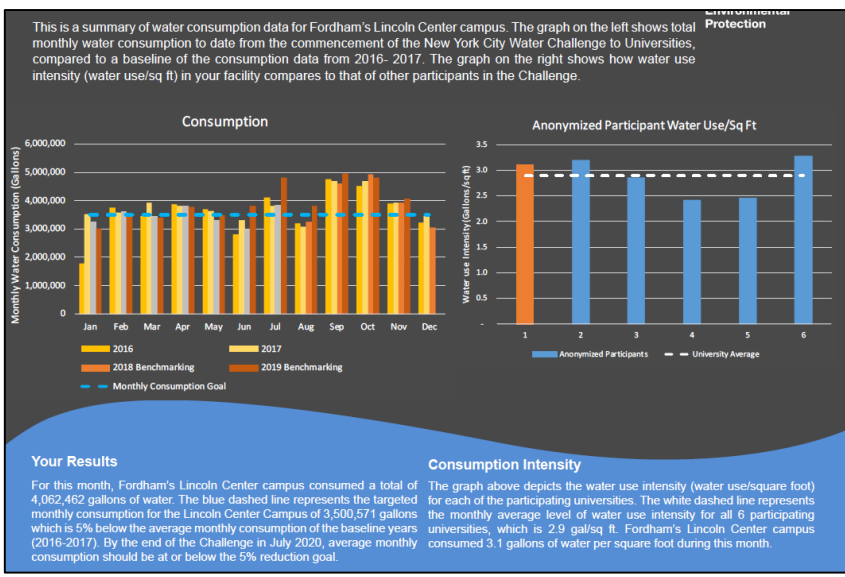
Loosely based on the Water Management framework, endorsed by US EPA on their WaterSense® website:

- Step 1: Making a Commitment
- Step 2: Assessing Facility Water Use
- Step 3: Setting and Communicating Goals
- Step 4: Creating a Water Conservation Campaign
- Step 5: Implementing the Water Conservation Campaign Strategies
- Step 6: Evaluating Progress
- Step 7: Recognizing Achievement





- 1. **Tracking Water Use.**
- 2. **Water Reduction Strategy.**
- 3. **Regular Workshops.**
- 4. **One-on-One Meetings.**
- 5. **Promotion and Recognition.**



*Example Monthly Water Use Report*

*Workshop hosted at Weill Cornell Medicine*



## Water Reduction Goals

- 5% reduction → Winner
- 7.5% reduction → Silver Winner
- 10% reduction → **Gold Winner**

## DEP promotes and recognizes participants and winners through:

- Award events
- News releases and posts on DEP's website and social media platforms



Hotel Water Conservation Challenge Closing Event with Assistant Commissioner of DEP's Bureau of Environmental Planning and Analysis

## Benefits of Participation

- Contributes to NYC Carbon Challenge successes and opens new opportunity for sustainability
- Helps earn AASHE STARS points
- Contributes to immediate and long term cost savings



# Water Challenge to Universities: Participants



Prior to the Challenge, we anticipated participants use roughly 790,000 gallons per day and 290,000,000 gallons per year

5% reduction            40,000 gallons/day; 14,000,000 gallon/year

10% reduction            79,000 gallons/day; 29,000,000 gallon/year

**Benchmarking Period:** August 1, 2018 – July 31, 2020

## **Schedule for First Year, 2018-2019**


- **August 2018:** Kick off Meeting
- **October (Campus Sustainability Month) 2018:** Workshop #1 – Water Conservation on Campuses, Guest Speakers: AWE and EPA WaterSense
- **January 2019:** Workshop #2 – Submetering
- **April 2019:** Workshop #3 – Water Conservation Campaigns
- **July 2019:** Conference Call – Prep for Annual Review

## **Schedule for Second Year, 2019-2020**

- **September 2019:** Annual Review
- **February 2020:** Workshop #5 – Innovative Building Technologies
- **April 2020:** Workshop #6 –?
- **July 2020:** Two-Year Challenge Wrap-up

# Conservation Campaigns


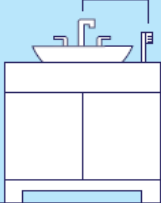




When providing water savings tips and context, participants wanted a coherent image of the Water Challenge across their campuses



## WATER CHALLENGE

We're in a challenge to save water. Help us win! NYC is lucky to have one of the best water systems in the world. Conserving water helps us prepare for climate change.

### HERE IS HOW TO SAVE WATER DAILY

<b>BATHROOM</b>	 <p>Aim for a 5-minute shower.</p>	 <p>When brushing your teeth and washing your hands, turn the faucet off.</p>	 <p>Do not use the toilet as a trash can. Each flush matters! For disposable wipes, trash it, don't flush it.</p>
	 <p>Bring a reusable water bottle to decrease plastic and water waste.</p>	 <p>If washing by hand don't run the faucet. If you have a dishwasher, only run full loads of dishes.</p>	 <p>Wash full loads of laundry.</p>

**DINING**




Avoid food trays and use a single plate to reduce washing.


**DISHES**


**LAUNDRY**

Let's do our part to win the Water Challenge. Every drop counts!

Report leaks to Facilities: \_\_\_\_\_


[nyc.gov/dep/waterchallenge](http://nyc.gov/dep/waterchallenge)




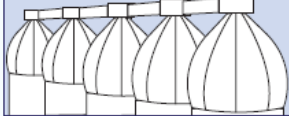

[@nycwater](https://twitter.com/nycwater)  
[#nycwaterchallenge](https://twitter.com/nycwaterchallenge)









## ONLY 1% OF THE WORLD'S WATER

is fresh and easily accessible. Fortunately, NYC has one of the world's best water systems. Make every drop count!

### NEW YORK CITY WATER FACTS

<p><b>POPULATION</b></p> <p>9 million New Yorkers use about 1 billion gallons of water every day.</p> 	<p><b>WATER TREATMENT</b></p> <p>Using less water reduces greenhouse gas emissions from treating water and sewage.</p> 
<p><b>CONSERVATION</b></p> <p>Conserving water helps us prepare for climate change and drought.</p>  <p><b>TIPS TO HELP</b></p> <ul style="list-style-type: none"> <li><b>Aim for a 5 minute shower</b> It can save about 10 gallons of water.</li> <li><b>Report leaks</b> A leaking toilet could waste 200 gallons of water daily.</li> <li><b>Wash full loads of laundry</b> A half load uses the same amount of water and energy.</li> </ul>	<p><b>OUR MISSION</b></p> <p>Let's do our part to win the Water Challenge and help New York City prepare for climate change.</p> <p>Every drop counts!</p> <p>Help us conserve water. If you see or hear a leak, report it to facilities.</p> <p>Call: _____</p>


[nyc.gov/dep/waterchallenge](http://nyc.gov/dep/waterchallenge)



[@nycwater](https://twitter.com/nycwater)  
[#nycwaterchallenge](https://twitter.com/nycwaterchallenge)


## Total Average Monthly Consumption (gallons)

Baseline (Jan 2016 – Dec 2017)	30,700,000
Benchmarking Period (Aug 2018 – Jul 2020)	27,600,000
Water Savings	3,100,000
Percent reduction to date	10%

### Some caveats:

- More mild weather in 2019
- Differences in student population
- Renting out dorm space in the summer

### Lessons Learned:

- Helpful to connect with similar networks in advance of program launch to promote the program
- Hands-on engagement and continuous outreach are necessary for program success; flexibility is key
- Universities have a unique array of factors that affect water consumption
- Academic calendar start date was not helpful

Thank you!

@nycwater

#nycwaterchallenge

waterchallenge@dep.nyc.gov



**Environmental  
Protection**

# Case Study: Weill Cornell Medicine

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# **College Water Efficiency Group**

**Weill Cornell Medicine – NYC DEP Water Challenge**



Michael T. Murphy  
WCM Water Conservation Committee  
Engineering & Maintenance

January 2020

# Agenda

- Weill Cornell Medicine – History and Demographics
- Process and Approach
- Project Overview
- Results To Date

# WEILL CORNELL MEDICINE



# Weill Cornell Medicine

- Founded in 1898 as the Medical College for Cornell University
- Relocated to current NYC Upper East Side location in 1932
- Opened Education City - Qatar campus in 2001
- Affiliations: NYP, HSS, MSK, & The Methodist Hospital (Houston)
- Tri-Pronged Mission
  - Education
  - Patient Care
  - Research

***Care. Discover. Teach.***



# Water Challenge Focus – Upper East Side



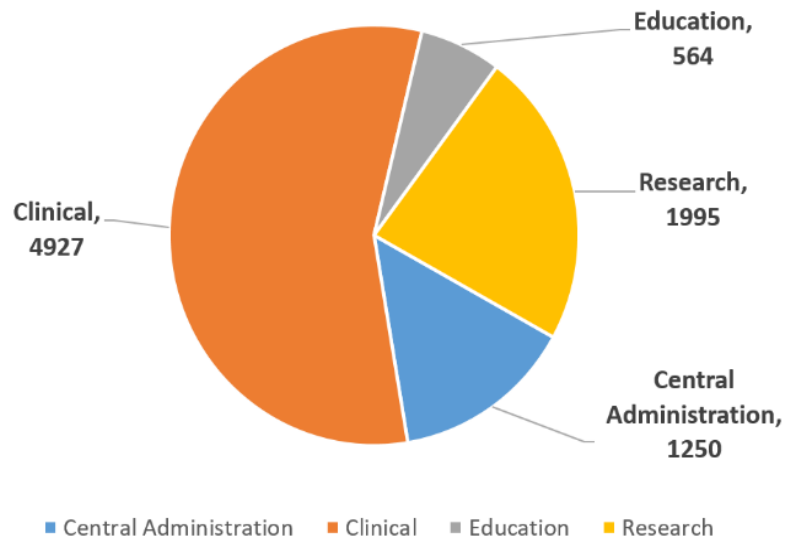
**Areas of Focus:**  
1,100,000 gsf

Lasdon House  
Olin Hall  
S Building

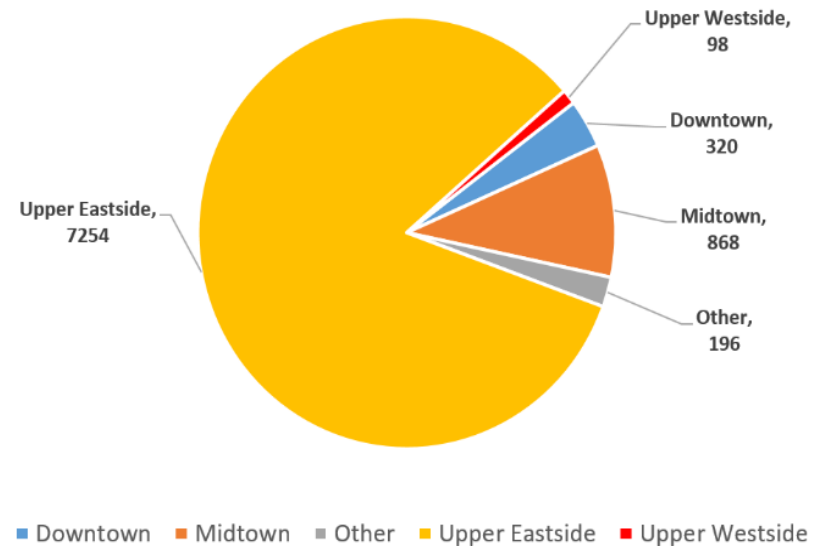
Weill Greenberg Center  
Imaging Center  
Belfer Research Building

# WCM Employee Demographics (n=8736)

## EMPLOYEES BY MISSION



## EMPLOYEES BY WORK LOCATION



# PROCESS & APPROACH

# Our Approach

## Establish a Water Conservation Committee

- Ronald Pierantozzi, *Supervisor* – E&M (Committee Chair)
- Dominique Dowd, *Administration, Sustainability* – E&M
- Angela Mu, *Energy Manager* – E&M
- Sheryl Abraham, *Manager* – Housekeeping
- John Bacile, *Manager* – Housing
- Byron McFarlane, *Plumbing Specialist* – E&M
- Andrew Carollo, *Plumbing Specialist* – E&M
- Justin Errante, *Refrigeration Engineer* – E&M
- Michael T. Murphy, *Senior Director* – E&M

## Simple Ask

- Brainstorm anything that could result in water savings
- Meet every two weeks
- Attend the NYC DEP Challenge Partner meetings





# WCM Water Conservation Committee



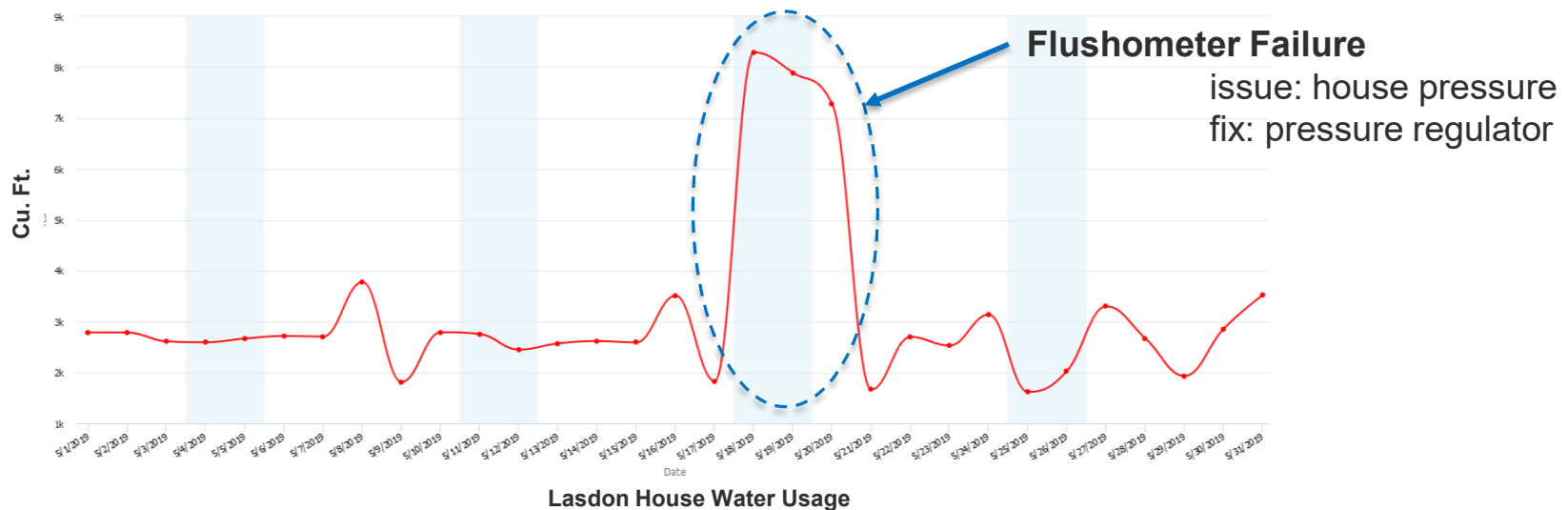
# Our Approach (cont.)

## Spread the Word

- Housekeeping & Custodial Services Team
  - they are in every space ... every evening
  - if it has a drip we want to know about it
- Effectively communicate the projects to building occupants

## Review the metering data

- review at each Water Conservation Committee meeting



# PROJECTS

# Completed Projects

## Belfer Research Building

### Autoclave Timer Installations

- reduce water / steam usage during inactive periods

## Lasdon House Residence Hall

### Low Flow Toilet Installation

- American Standard visit and best fit selection
- Adequate communication to student body

# Being Investigated

## **AHU Condensate Collection Systems**

- redirect condensate to Cooling Towers

## **Supply Air Humidification (Belfer MeeFog System)**

- redirect excess to storm water recovery tank
- use for irrigation

## **Chemical Treatment – Sensing / Sampling Effluent**

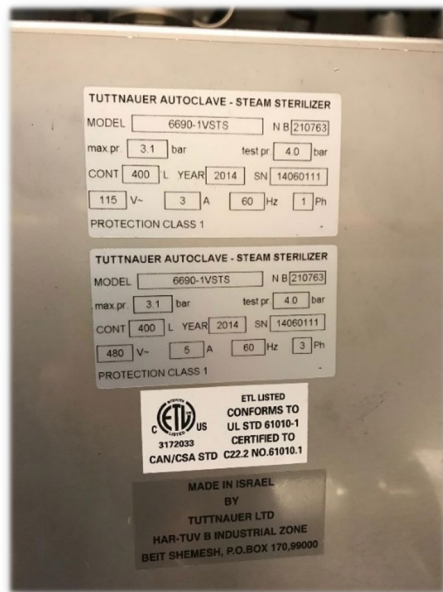
- reroute back into the Cooling Tower

## **Upgrade Irrigation Systems and Controllers**



# Belfer: Autoclaves

- SPECIFICATIONS
  - 2 per floor x 12 floors = 24 total units
  - Tuttnauer Model 6690LM-1VSTS
- MPS used for clean steam generation and jacket temperature
- DCW cools the heat exchanger and condensate to drain
- Electronic sensors maintain 140 degrees discharge to drain



# Belfer: Utility Impact per Device

- **Water Usage**: approx. 1.5 gallons per minute w/ unit on standby ...

***18,250,000 gallons per year building wide!!***

- **Steam Usage**: 10 lbs per hour w/ unit on standby ...

***2,100,000 lbs per year building wide!!***



# Belfer: Solution



- Installed 24 timers at total cost of \$ 7,000
- Work done directly by Tuttnauer
- Zero impact on service contract

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**Timers turn units OFF 12 hours per day ....**

Goal: eliminate 'standby' mode & halve the water usage

**Projected water reduction: 9 million gallons / year**

**Est. Utility Savings:**

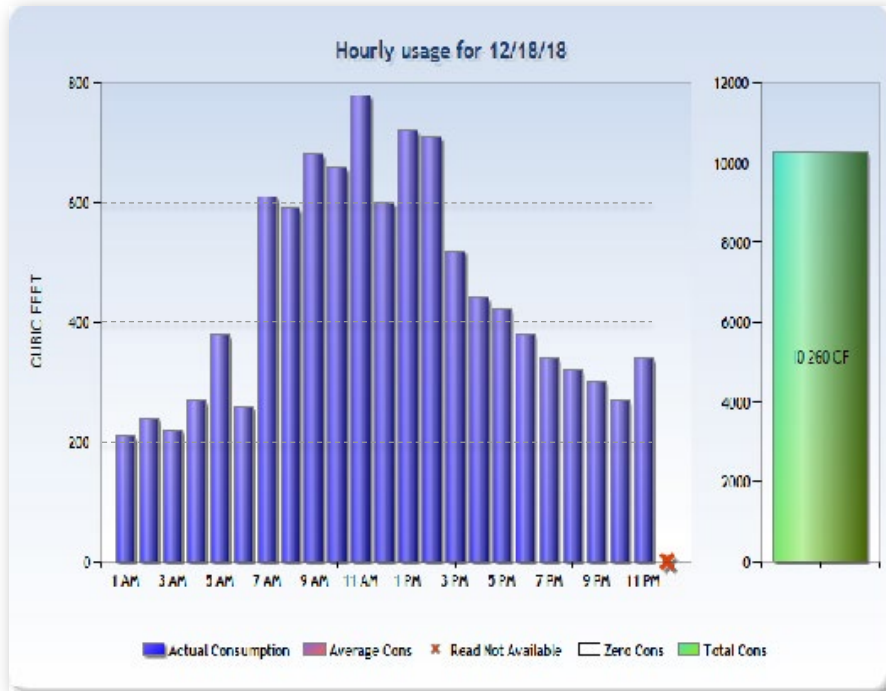
DCW                      \$ 123,000 / yr

Steam                    \$ 42,000 / yr

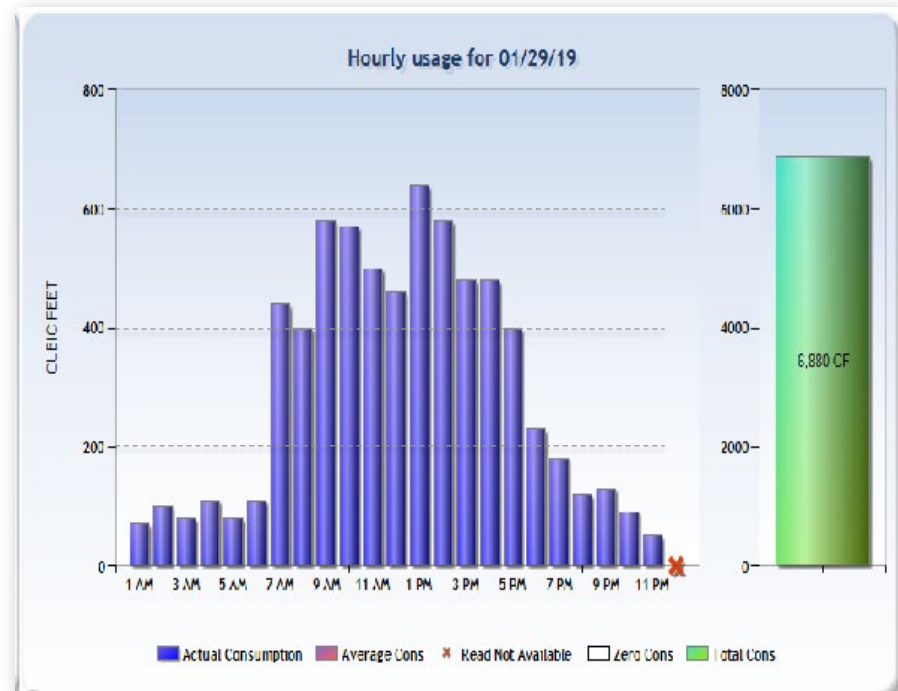




# Belfer: Results



**BEFORE**  
Wednesday 12-18-2018

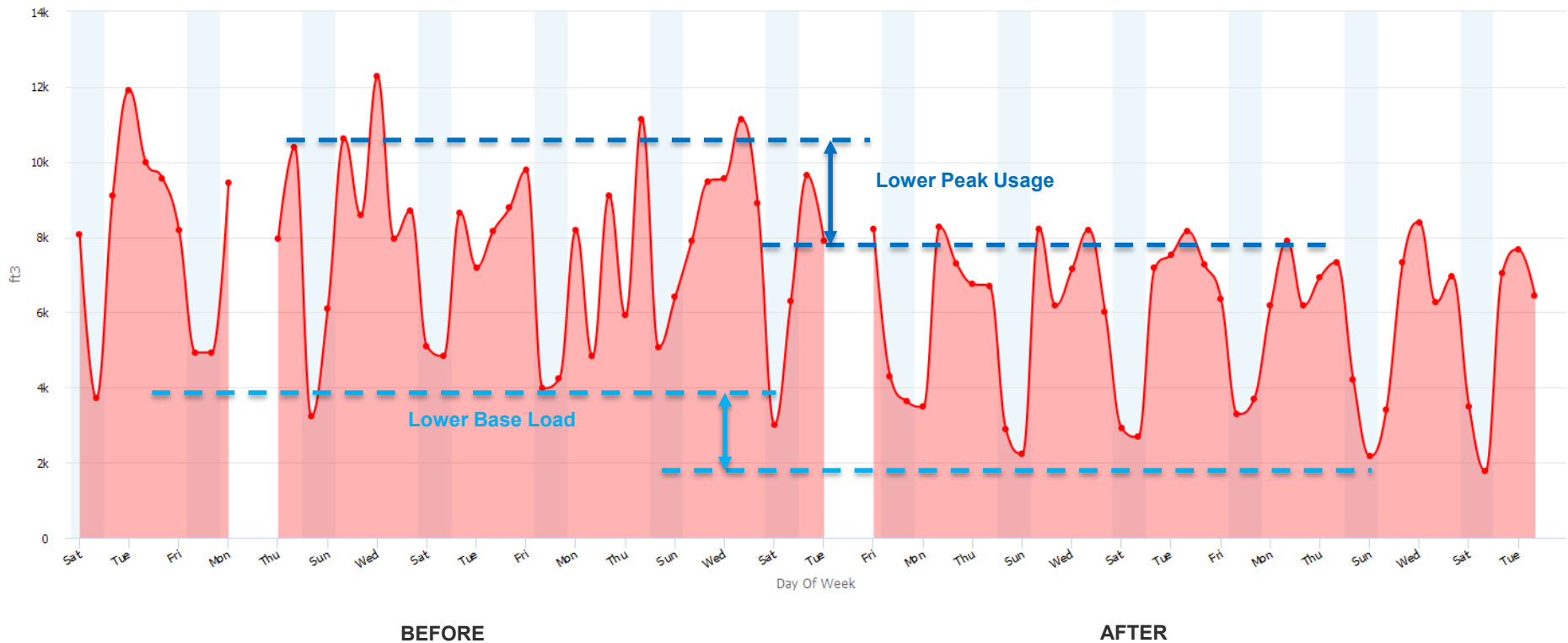


**AFTER**  
Wednesday 1-29-2019

Data Source: DEP Customer Portal

# Belfer: Results (cont.)

## Belfer Research Building Domestic Water Daily Usage – 12/1/18 thru 2/28/19



Data Source: WCM EMIS

# Lasdon House: Toilet Conversion



- **Floors 1 thru 5:**
  - Recently renovated with 1.6 gpf toilets as part of Capital Project
- **Floors 6 thru 10:**
  - Toilets in apartments converted to 1.28 gpf
  - In-house labor / completed in April 2019
- **Floors 11 thru 15:**
  - Toilets in apartments converted to 1.28 gpf
  - In-house labor / completed in June 2019

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## **Considerations...**

- ***adequately communicate to student body***
- ***overall impact and schedule***
- ***leave a note .. tell them how this helps***



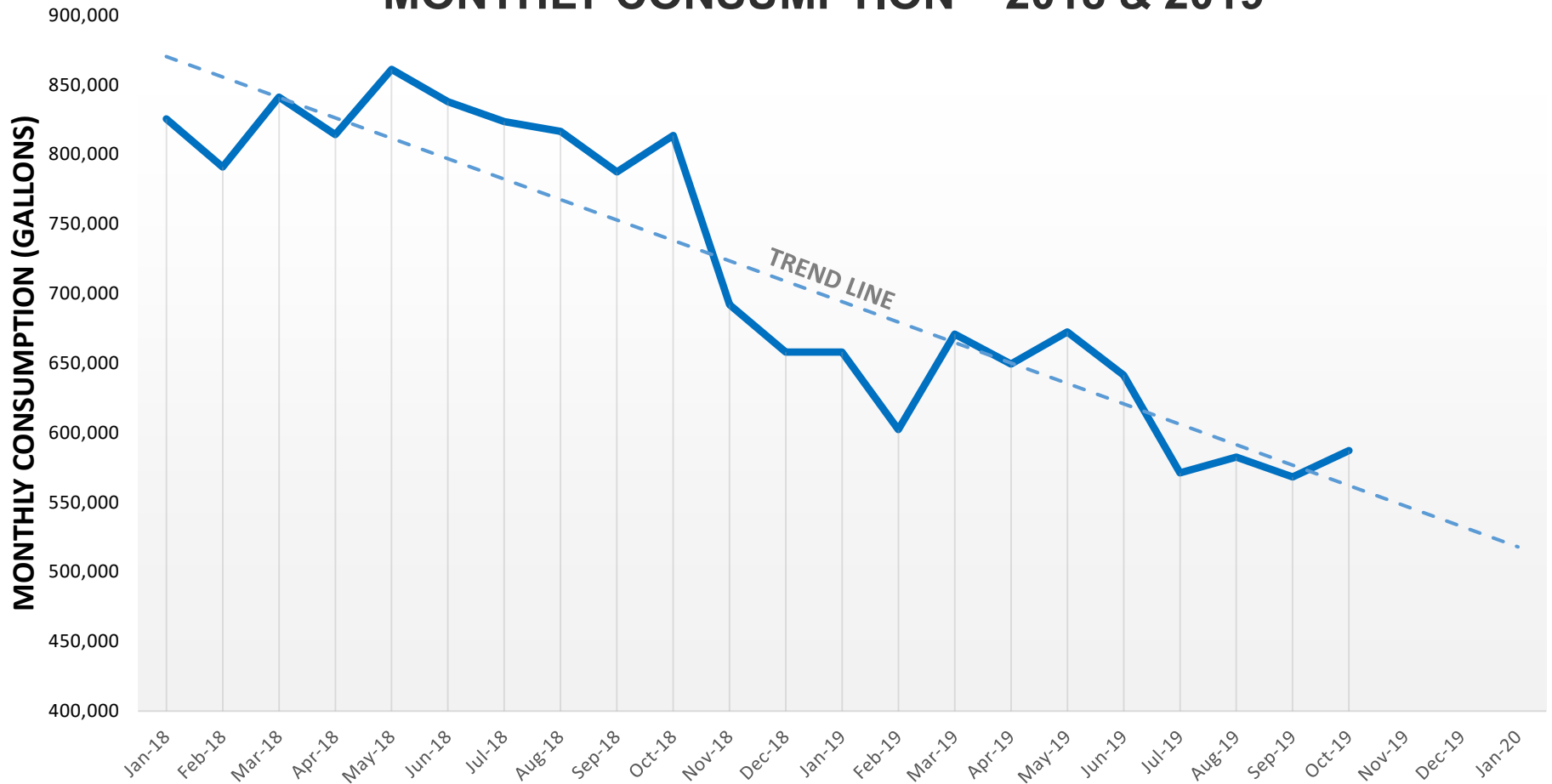
# Lasdon House: Estimates

OLD	LASDON HOUSE	NEW
170	TOILETS	170
3.5	GALLONS PER FLUSH	1.28
4 / DAY	FLUSH PER PERSON	4 / DAY
43	PEOPLE PER FLOOR	43
1,720	FLUSH PER DAY	1,720
6,020	GALLONS PER DAY	2,201
2,197,300	GALLONS PER YEAR	803,584
EST. DAILY H <sub>2</sub> O SAVINGS		<b>3,819 gal</b>
EST. ANNUAL H <sub>2</sub> O SAVINGS		<b>1,393,935 gal</b>
DAILY SAVINGS (@ \$.0135/GALLON)		<b>\$52</b>
ANNUAL SAVINGS		<b>\$18,818</b>
MATERIAL COST (170 @ \$300)		<b>\$51,000</b>
MATERIAL ONLY PAYBACK		<b>2.7 YEARS</b>



# Lasdon House: Results

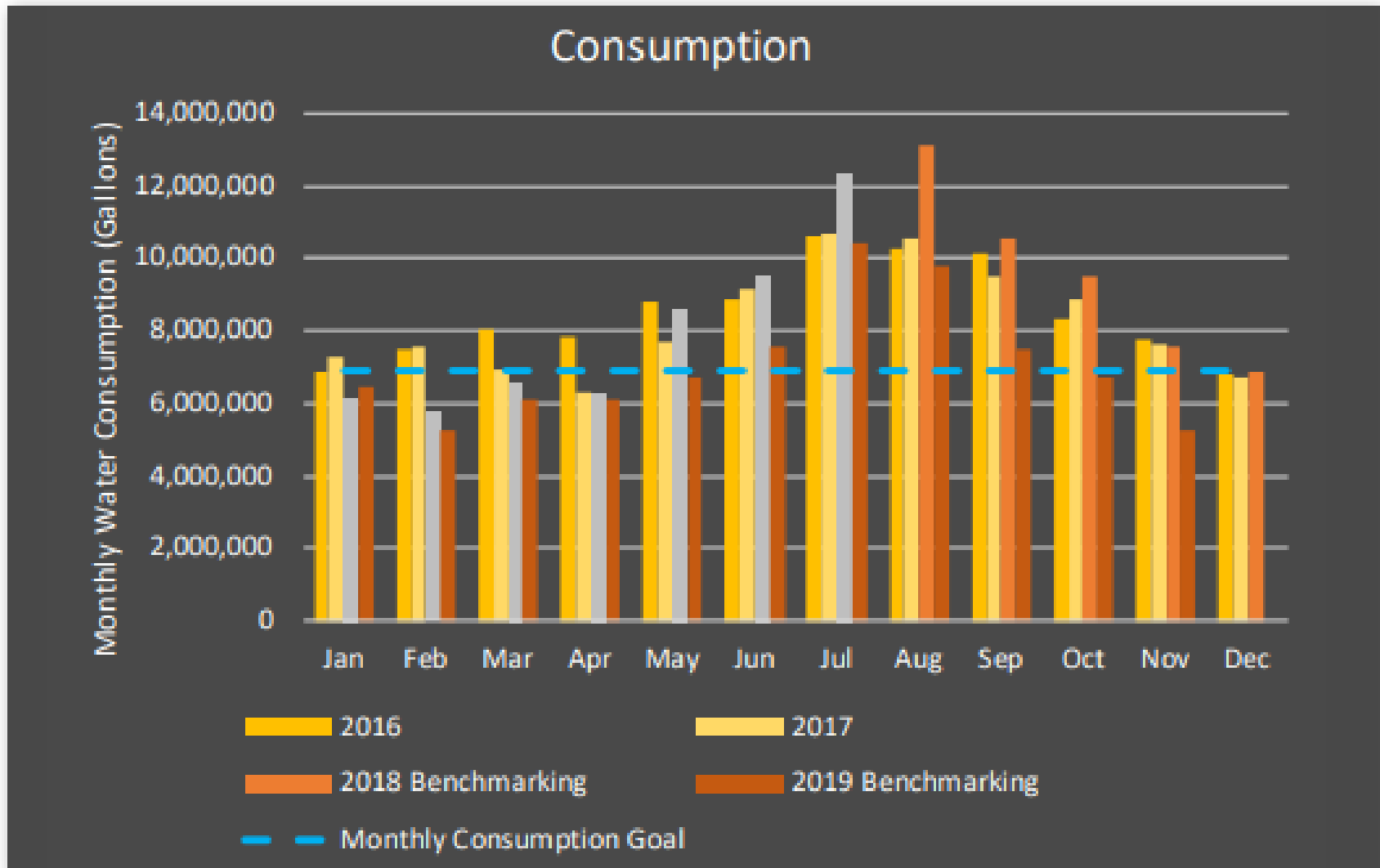
## MONTHLY CONSUMPTION – 2018 & 2019



Data Source: actual DEP water bills; excludes cooling tower usage

# CAMPUS RESULTS

# Upper East Campus: Results



Data Source: DEP November 2019 report



# Upper East Campus: Results (cont.)

**2018 – January through November**

Total Consumption: 71,644,000 gal

**2019 – January through November**

Total Consumption: 54,511,000 gal

<b>Water Reduction (gal)</b>	<b>17,133,000 gallons</b>
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<b>Est. Cost Savings</b>	<b>\$ 231,000</b>
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Data Source: DEP November 2019 report





**Weill  
Cornell  
Medicine**