



What if Amazon Ran a Wastewater Treatment Facility?

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To understand what Amazon would do...

...we must understand who Amazon is!

Amazon is known for disruption of well-established industries through technological innovation & mass scale



The Amazon Spheres, Amazon Headquarters – Seattle, WA

Six Important Aspects of Amazon



Multinational Corporation



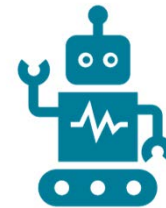
E-commerce



Cloud Computing



Artificial Intelligence



Robotics



Digital Streaming

Amazon is a Multinational Corporation



Rendering of HQ2 in Arlington, VA

<https://www.aboutamazon.com/news/amazon-offices/the-next-chapter-for-hq2-sustainable-buildings-surrounded-by-nature>

- ▶ Amazon will not run just one WRRF
- ▶ Amazon would bring the best aspects from all over the world
 - Water reuse
 - Biosolids – beneficial reuse & nutrient recovery
 - Energy – net zero
- ▶ They will not be afraid to build new rather than build on old
- ▶ Speed rate of innovation

Amazon Could Fuel the Food / Water / Energy Nexus



- ▶ Amazon bought Whole Foods in 2017
- ▶ Amazon is the world's large corporate purchaser of renewable energy
 - Solar & wind
 - Goal: carbon neutral by 2040
- ▶ What if Amazon WRRFs supplied water and nutrients for food production?
 - Anaerobic digestion for energy
 - Recycled water for hydroponics
 - "Farm to Table" becomes a loop
- ▶ Amazon is investing in climate-focused companies
 - Hippo Harvest



The WRRF of the Future is a Community Resource



Amazon's mission is to be Earth's most customer-centric company...

- ▶ Contribute socially and culturally to the community it serves
- ▶ Amazon WRRFs would be a recreational center for the community

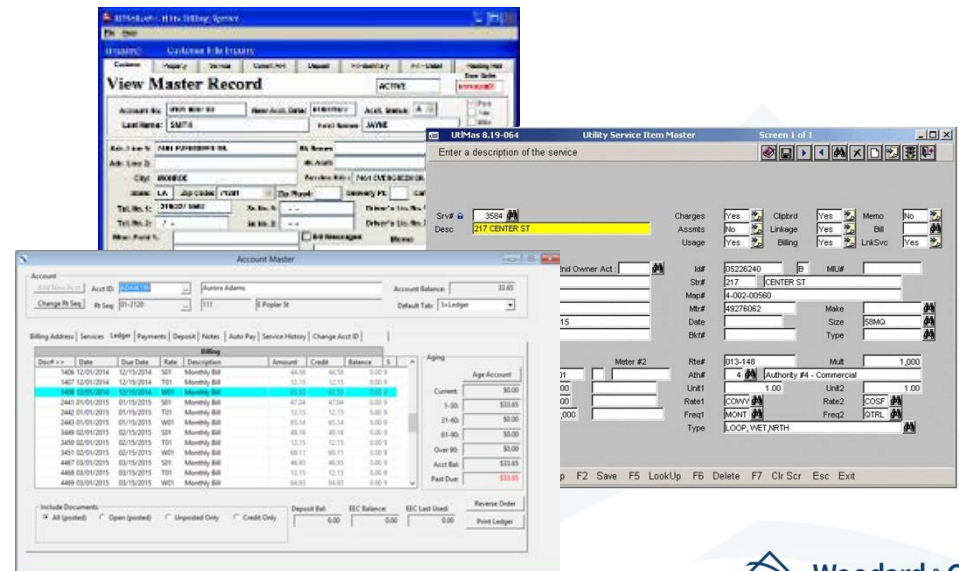




Amazon is a leader in E-commerce

- ▶ Amazon
 - New look & functionality
 - New app to facilitate payment
 - LOTS of communication between the utility & the customers
 - They may have customer loyalty plan with discounts
- ▶ Benefits for WRRFs
 - Ease
 - Clarity of services you are buying

“Electronic commerce” – the buying and selling of goods or services using the internet, including the transfer of money and data to execute these transactions





Opportunity to Rethink Partnerships

- ▶ Amazon
 - They may not “own” equipment
 - Contract Operations
 - Amazon is #4 on the Forbes 2021 World’s Best Employers List
 - Run it the most flexible way possible

- ▶ Benefits for WRRFs:
 - Opportunity to change/update poor performing equipment
 - Speed adoption of new technology
 - Workforce development



<https://www.worldwaterworks.com/technologies/indensechnologies> - World Water Works

Amazon is a Pioneer in Cloud Computing



- ▶ Amazon has approximately one third of the Cloud hosting market share

“Cloud computing” is the on-demand availability of computer system resources, especially data storage (cloud storage) & computing power, without direct active management by the user





Cloud Technology Brings Flexibility



Data storage and processing is off-site



Applications live on the web and critical data is stored, processed, and backed up automatically



Operators use tablets and can control any part of the plant remotely
No more bulky control panels!



Security???



The WRRF Would Have Sensors on EVERYTHING!

► Amazon Monitron

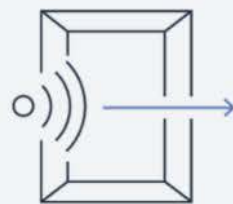
- Utilizes machine learning to detect abnormal behavior in industrial machinery

► Benefits for WRRFs:

- Operational optimization
 - Example: wet weather system storage management
- Asset Management
- Fewer emergencies – planned maintenance



Amazon Monitron Sensors



Amazon Monitron Gateway



Amazon Monitron ML-based service



Amazon Monitron mobile app

<https://aws.amazon.com/monitron/>



Amazon Leverages Artificial Intelligence

▶ Amazon

- Amazon has taken its business to the next level by redesigning the company around its AI
- Amazon AI is not a particular area of the business- it cuts across all aspects of the company
 - AWS
 - Product recommendations
 - Alexa

▶ WRRF Benefits

- Operator could access data via a conversation
- Operational Efficiency
- Focus on Individuality

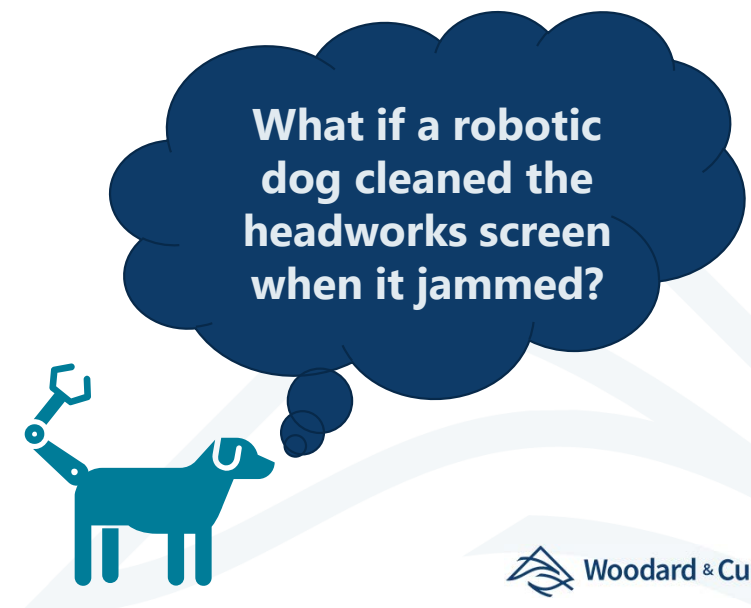
Artificial Intelligence is the ability of a computer or machine to mimic the capabilities of the human mind



Robots Will Work Alongside Operators



- ▶ Amazon
 - 2012 purchased Kiva Systems
 - 2014 started using robots in its warehouses
 - Now more than 200,000 robots in action
 - Revolutionized efficiency in the warehouse
 - Reduced costs and enabled fast shipping
- ▶ Benefits for WRRFs
 - Increase operational efficiency and consistency
 - Reduce staff time spent on menial tasks
 - Safety benefit for higher-risk tasks



A Glimpse into the Future Through My Son's Eyes

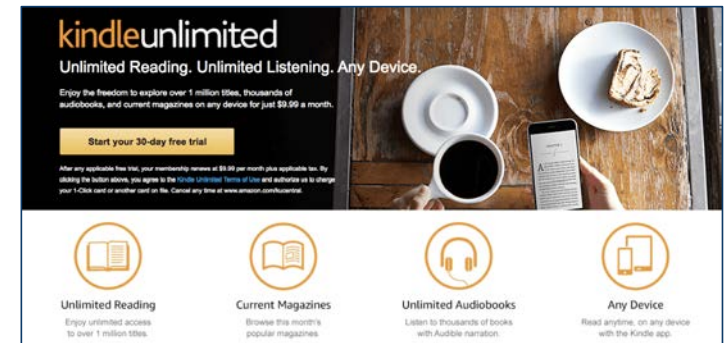


Boston Dynamics "More Parkour Atlas" YouTube Video
https://www.youtube.com/watch?v=_sBBaNYex3E

Amazon provides Digital Streaming to Prime Members



- ▶ Amazon Prime is a subscription model
 - Sewer is too! Pay monthly/quarterly/annually for service
- ▶ Amazon will have multiple subscription plans
 - Basic plan – sewer service
 - Advanced plan – circular economy
 - includes food / water / energy benefits



Customer Service is Critical

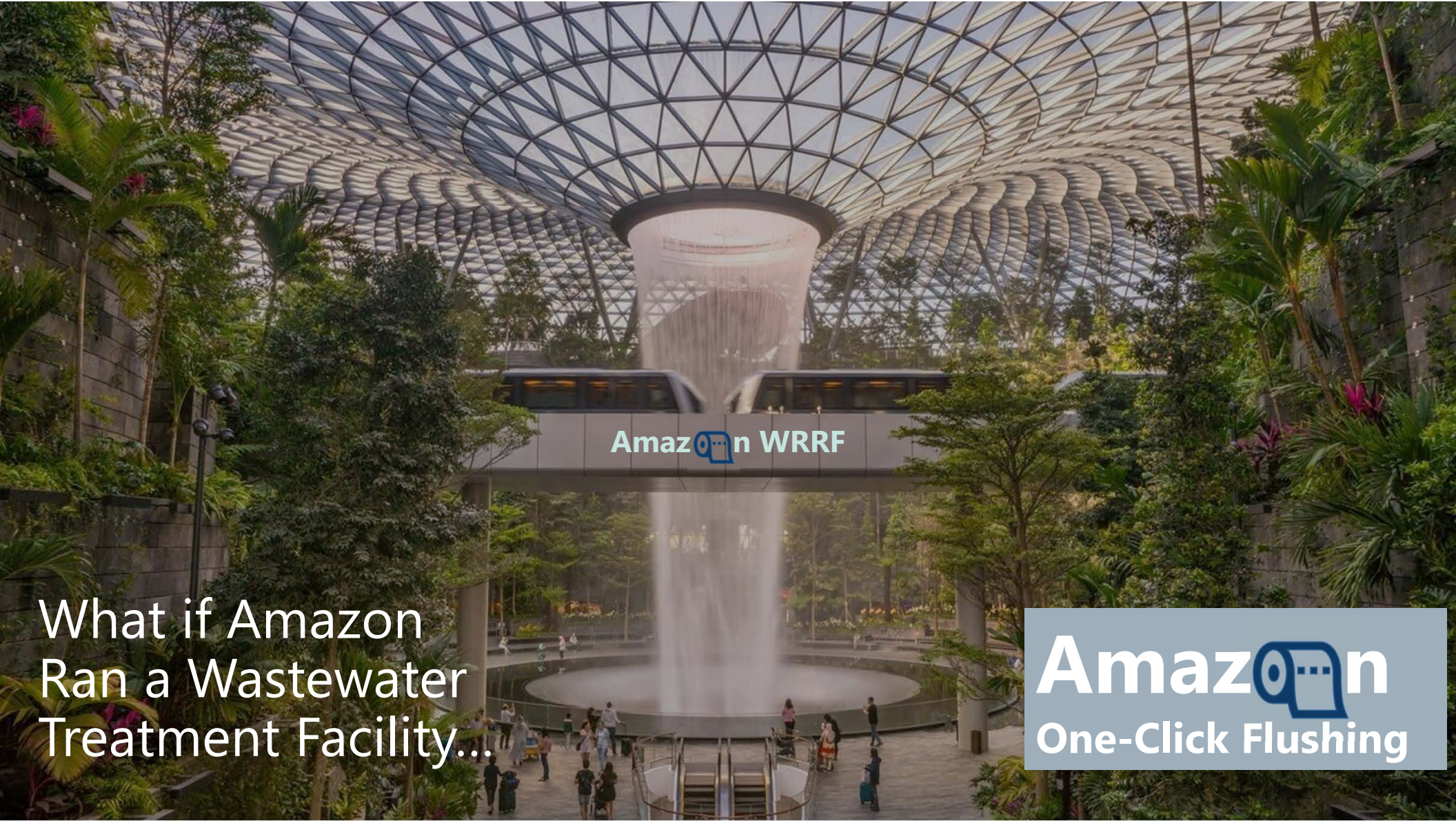


- ▶ Amazon
 - Cares about their brand
 - Knows customers better than they know themselves
- ▶ Benefit for WRRFs
 - Value of Water clearly articulated
 - Close gap in shortfall between infrastructure funding and need

\$4.8 trillion

Needs to be invested in water infrastructure over the next 20 years to maintain a state of good repair

Source: American Society of Civil Engineers



Amazon WRRF

What if Amazon
Ran a Wastewater
Treatment Facility...

Amazon
One-Click Flushing

The background image shows two large, geodesic glass domes (the Amazon Spheres) in a city setting at dusk. The domes are illuminated from within, showing lush greenery. Several tall, modern skyscrapers with lit windows surround the spheres. The sky is a deep blue. In the foreground, there is a paved area with some people walking and a small garden area with plants.

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