

# ALIGNING INFRASTRUCTURE ASSET MANAGEMENT PLANS WITH THE NEW DIGITAL ERA

March 12, 2020



# Agenda



How valuable is Data?



Asset Management Principles

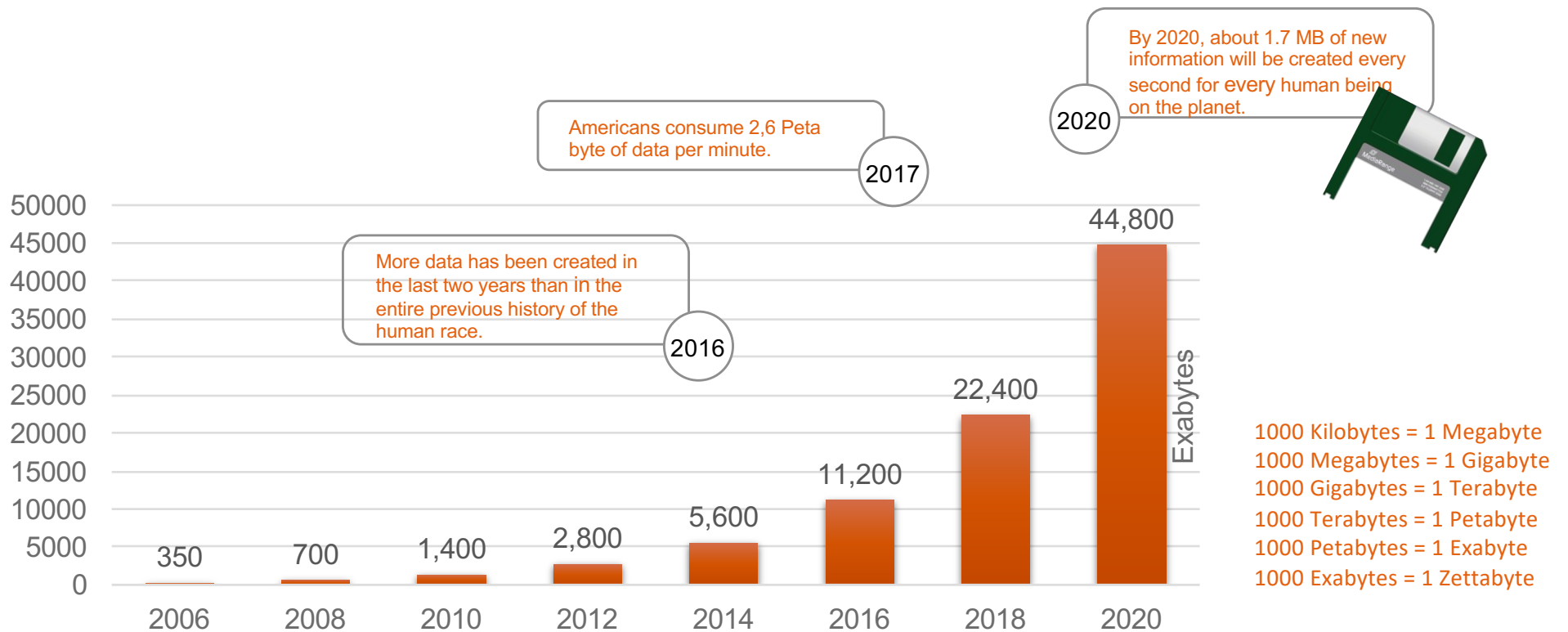


Digital Data Collection

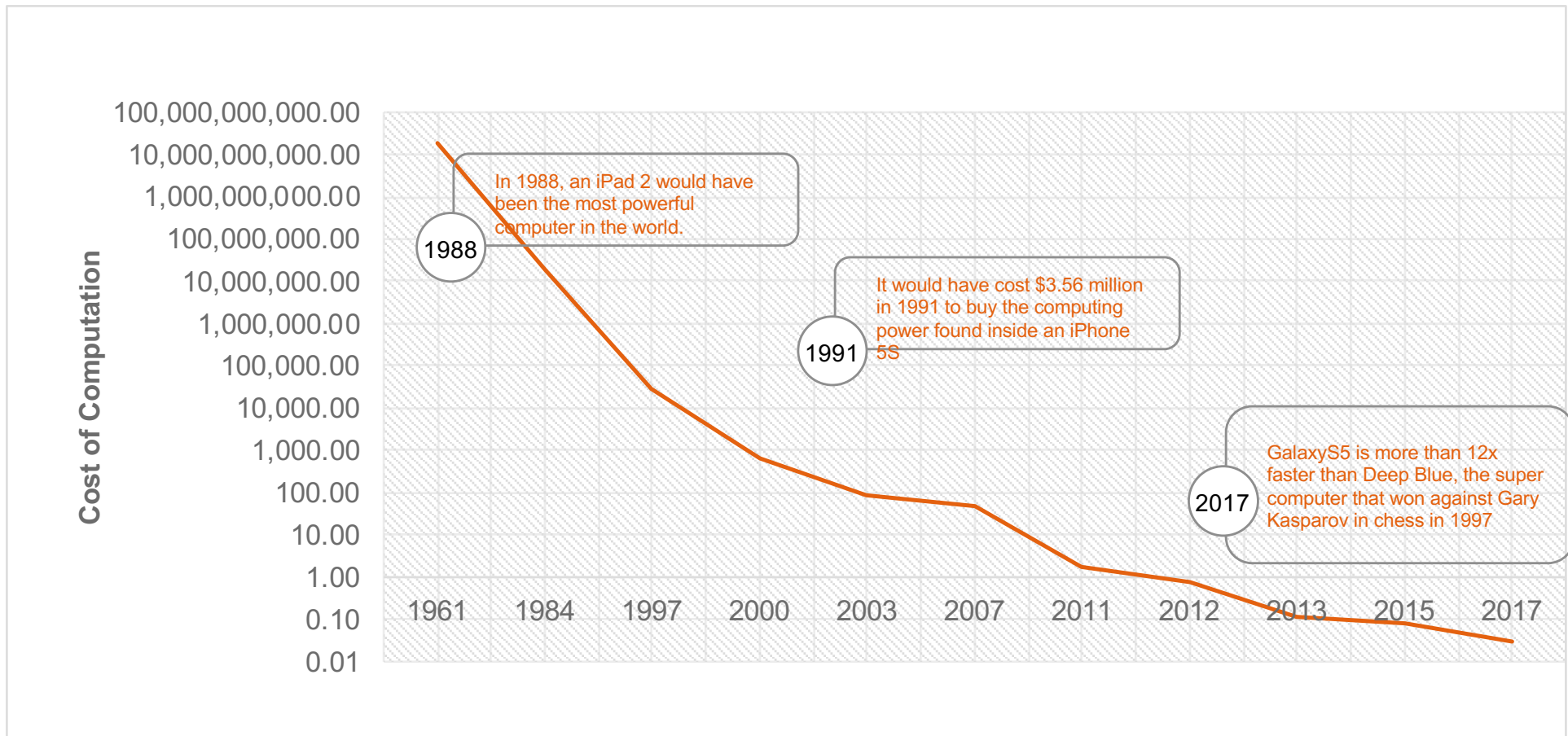


Capital Planning and Forecasting

# The amount of data increases exponentially and doubles every 2 years, while...

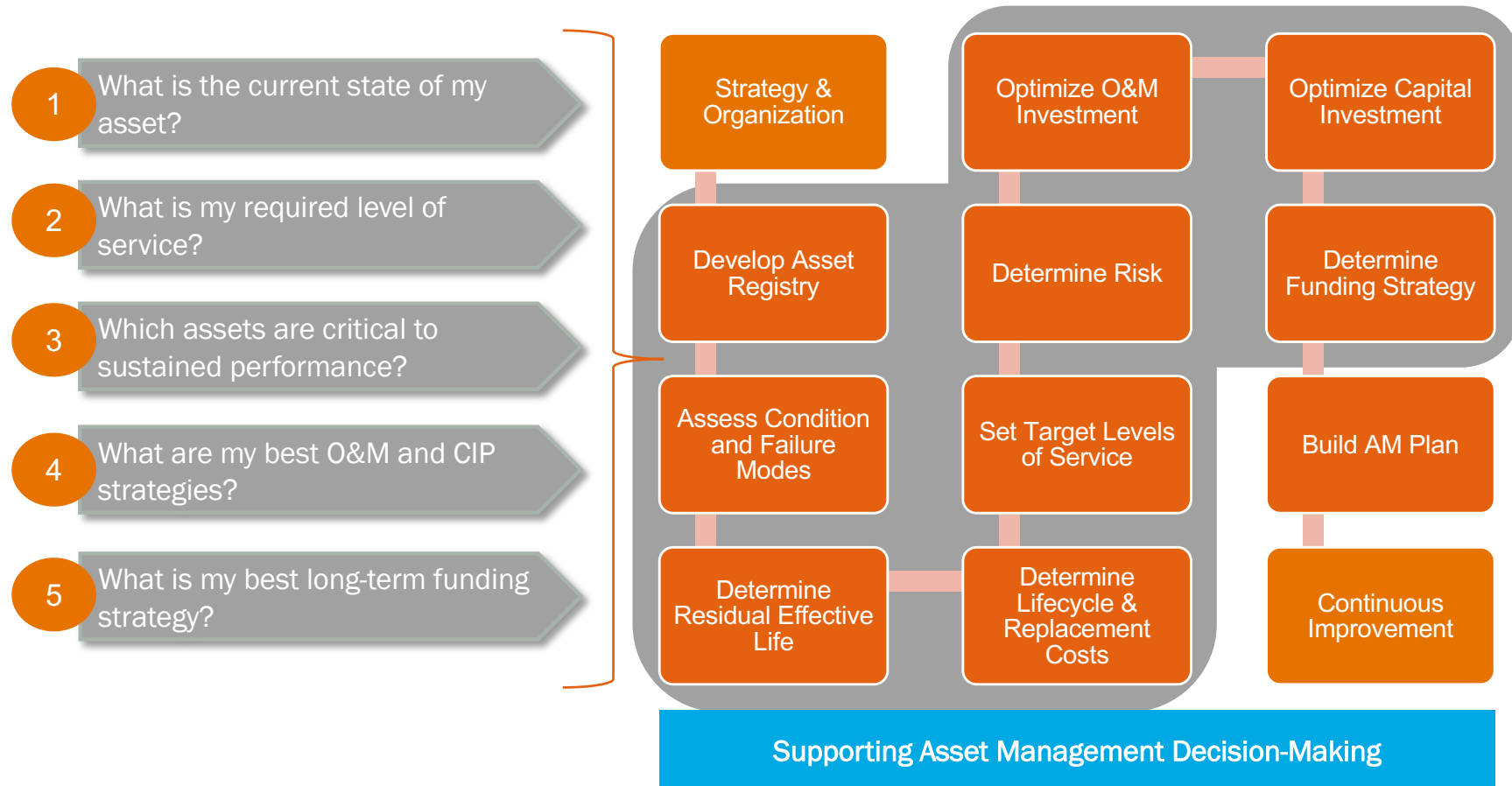


## ... the cost of computationally power halves about every 18 months, ...





# Core Concepts of Asset Management



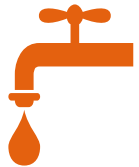
**What stage of an Asset Management Plan do you/your community need assistance with?**

**Go to [www.menti.com](https://www.menti.com) and enter code  
66 26 03**

# Why do we need an AMP?



Annual investment need grown 7-fold since 2000 (ASCE)



Actual Investment in the water utility sector has remained flat



Water and Sewer rates gone up by 31%



However, only 21% of utilities feel they can cover the full costs of providing the required level of service

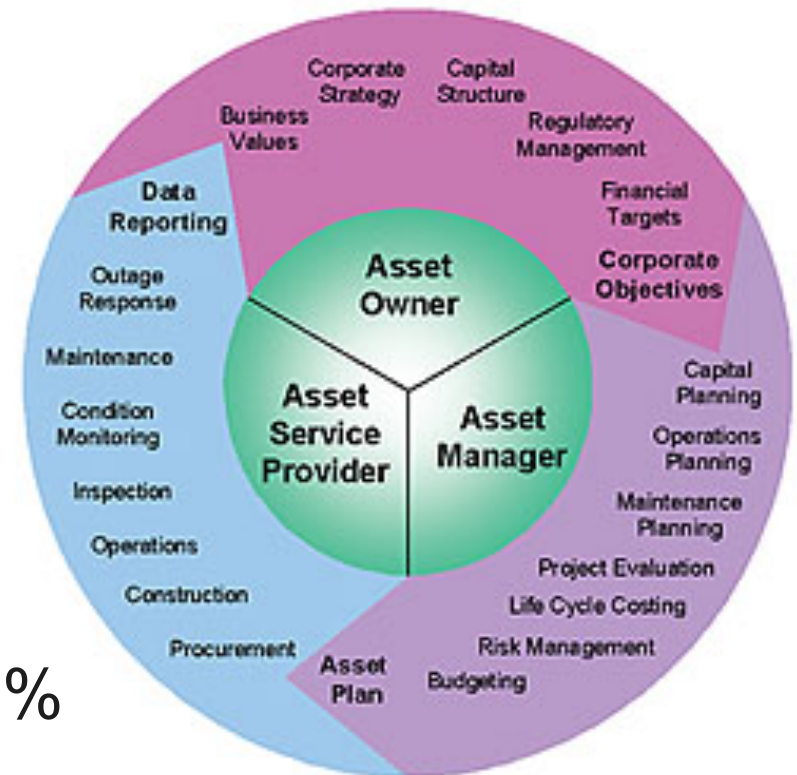
# It is not purely technical

Traditional plans focus only on the infrastructure

People and Data are both important factors that need to be considered

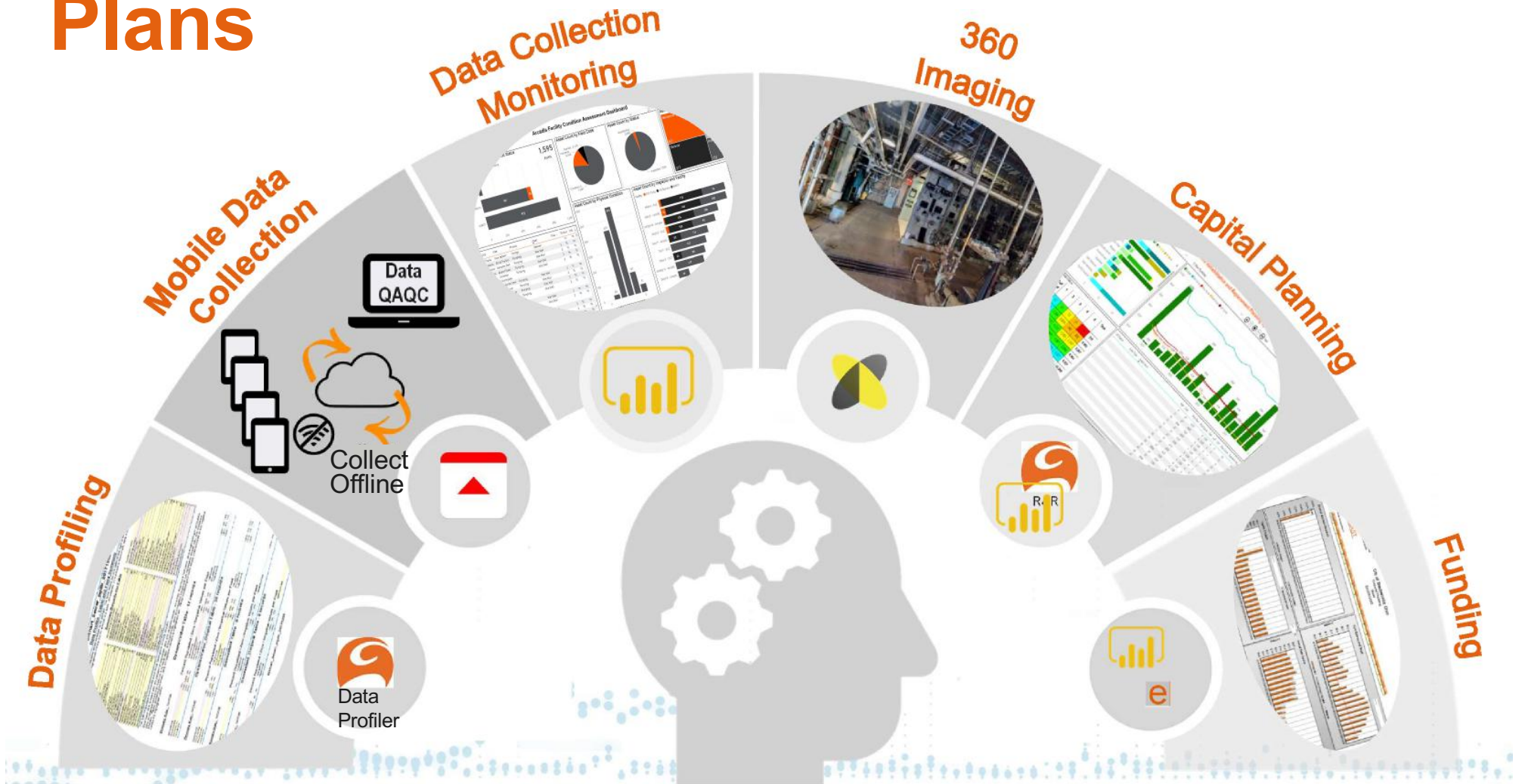
Relies on historical data- Access to data challenging due to silos

Relying on age/time-based replacement- accuracy as low as 18% in some cases

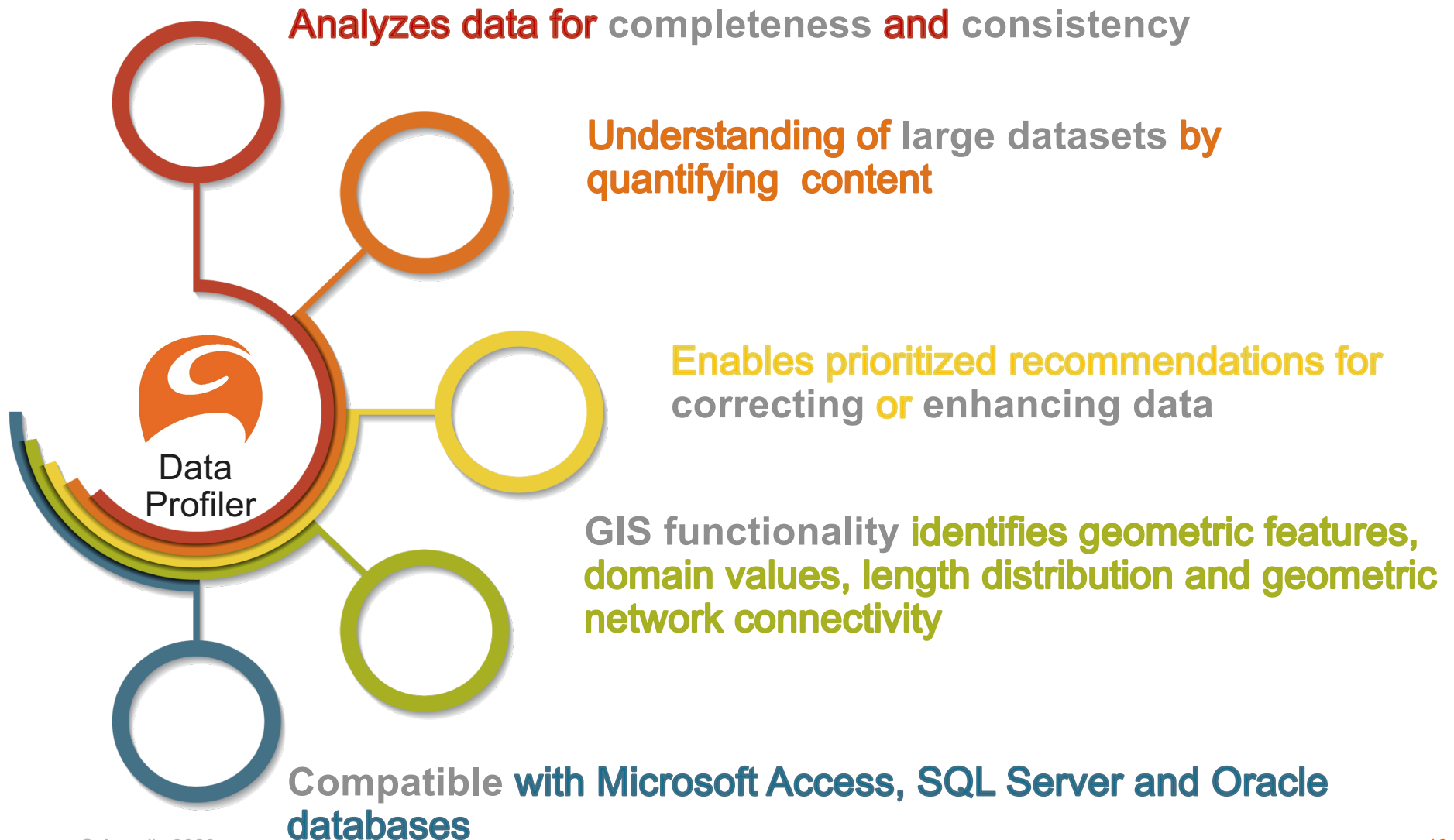


**Let's not repeat these as we develop new AMPs**

# Digital Tools for Asset Management Plans



# Database Profiler (Linear)



# Fulcrum (Facilities)

**Platform** for mobile data collection **with over 1000 Arcadis users**

Design custom mobile forms **in your** web browser **with their drag-and-drop form builder**

**Quickly deploys to field staff for fast mobile data collection**

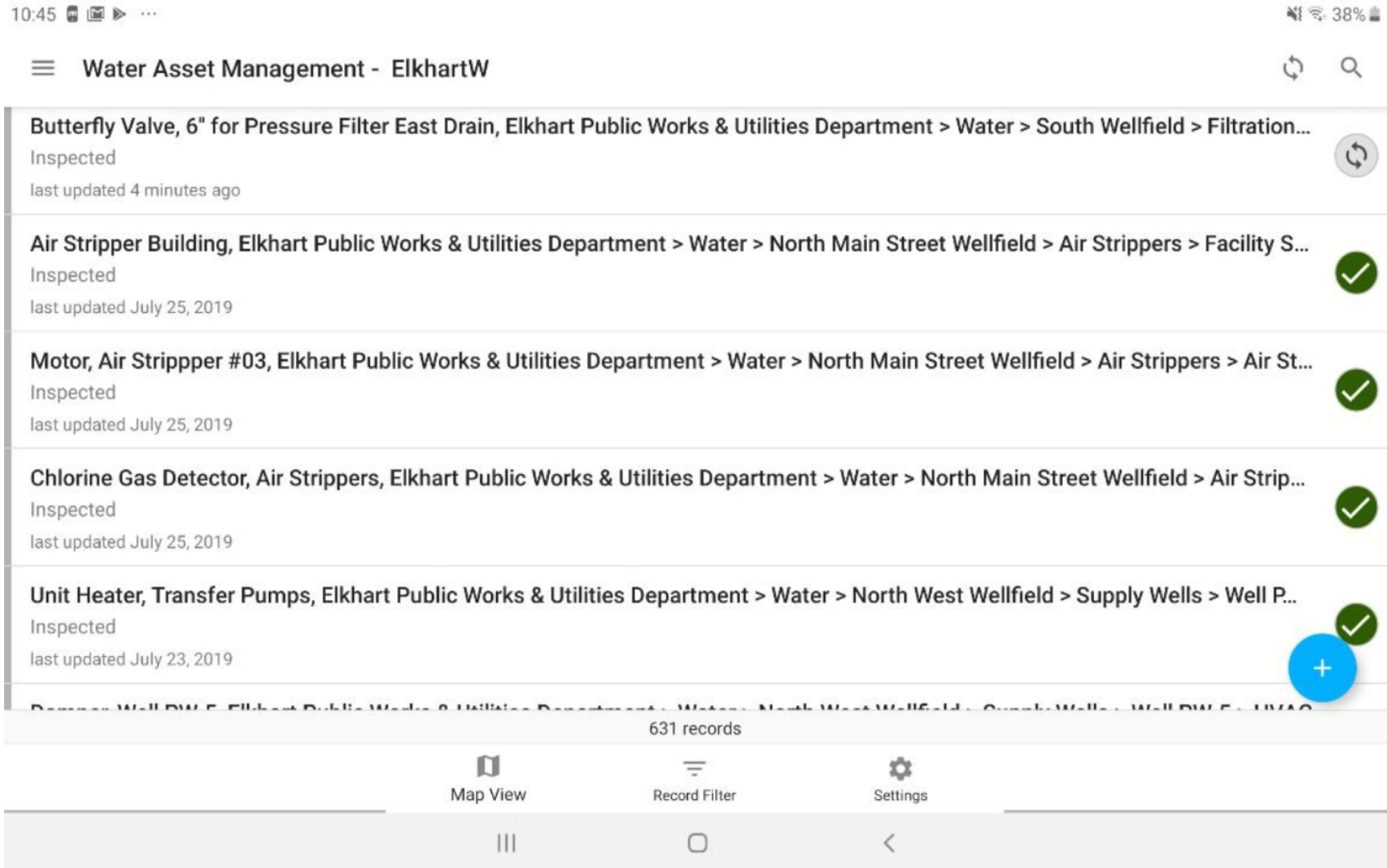
**Compatible with Android and iOS**

**Allows for offline data collection**





# Mobile Data Collection



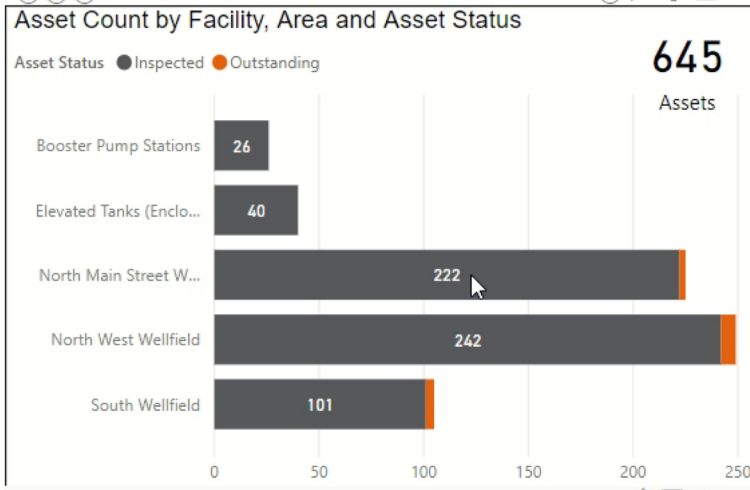
# Data Collection Monitoring

## Elkhart WW Facilities PBI v0.1

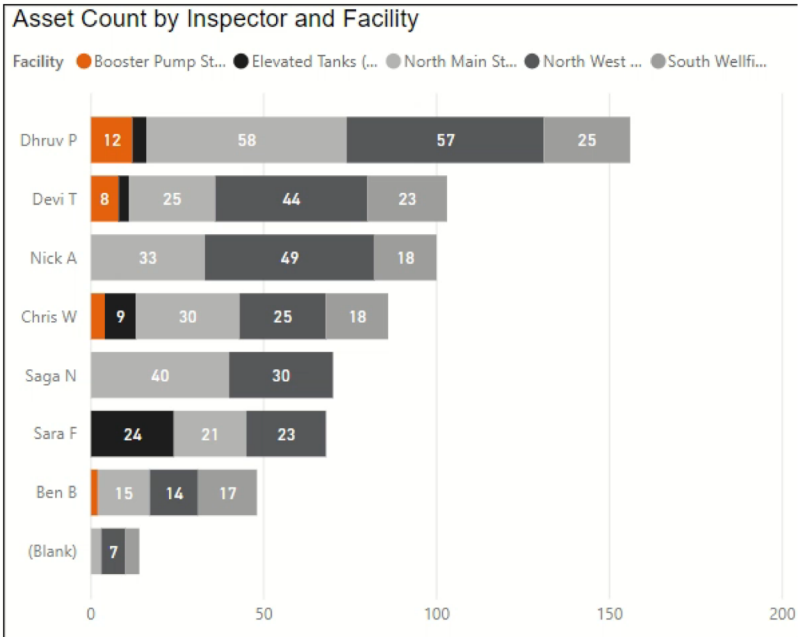
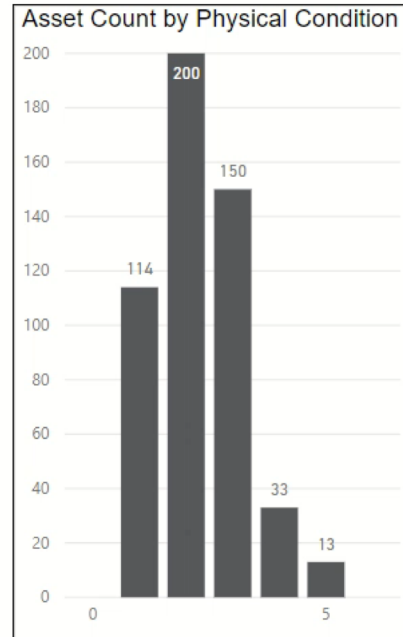
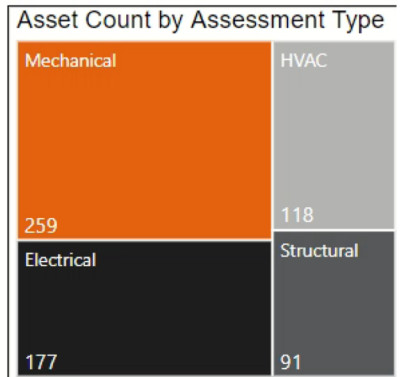
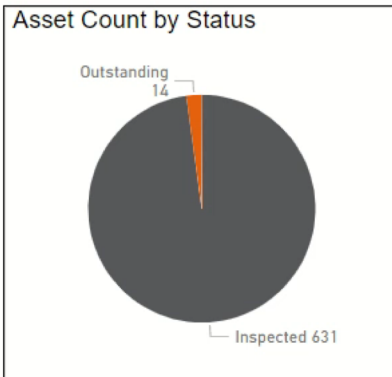
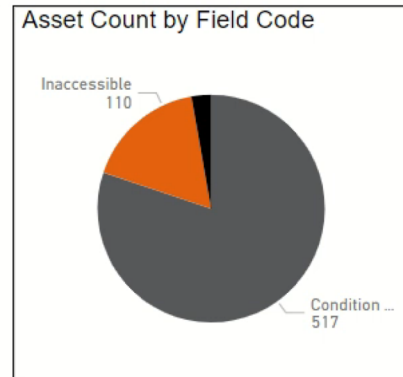
## Arcadis Facility Condition Assessment Dashboard



Last Refresh 9/4/2019 8:48:56 AM



Facility	Area	Process	Asset	Max ...	Photos	Edit
Water	North Main Street Wellfield	Air Strippers	Butterfly Valve, 12" Influent Water Line to Air Stripper tower 2	5		
Water	North Main Street Wellfield	Air Strippers	Hoist	5		
Water	North Main Street Wellfield	Air Strippers	Butterfly Valve, 12" Influent Water Line to Air Stripper tower 1	5		
Water	Elevated Tanks (Enclosed Storage)	Benham Avenue	RTU, Bower Street	5		
Water	North West Wellfield	Aerators	Aerator 1	5		

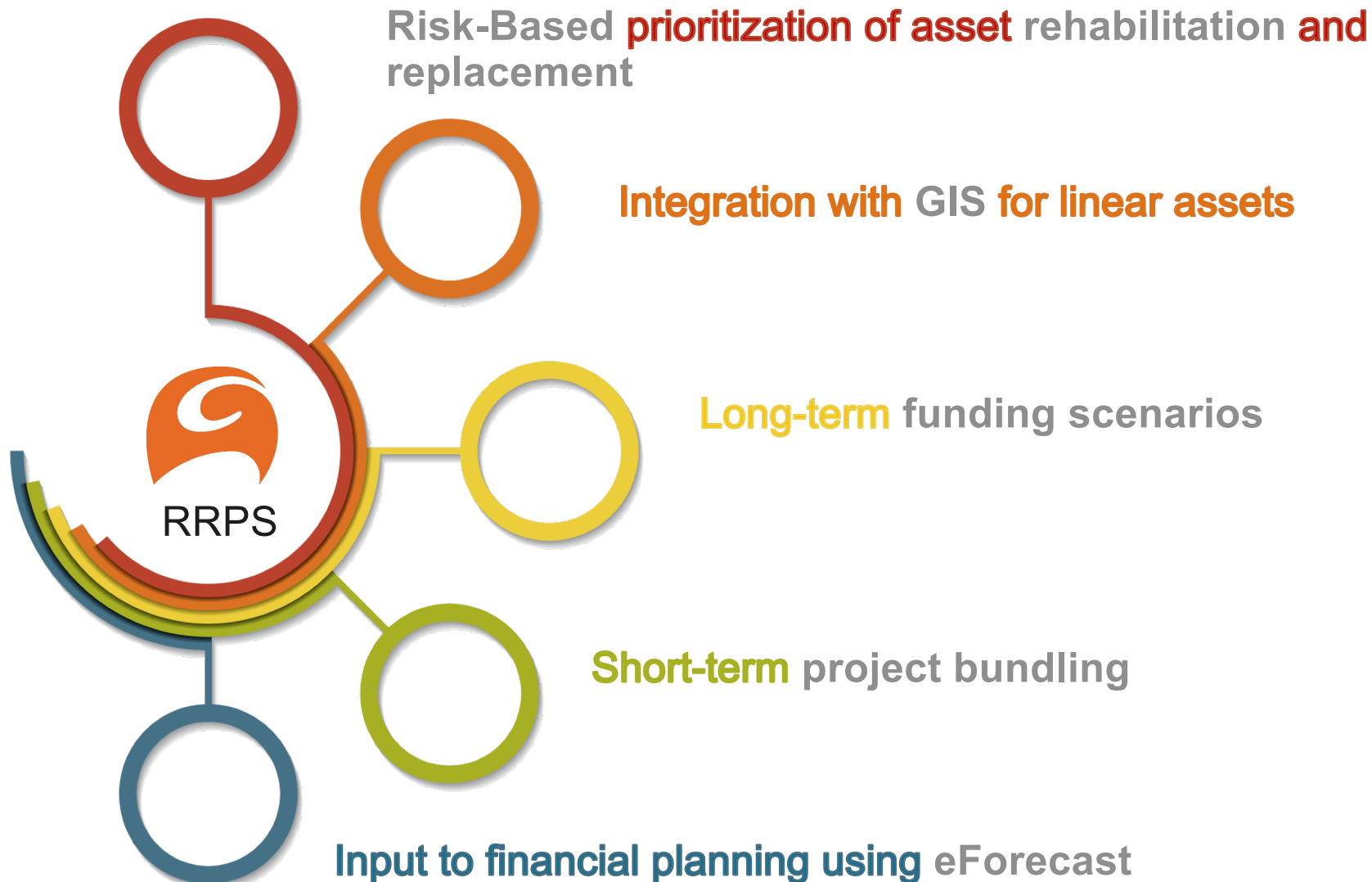


# 360° Imaging



360° Imaging

# Defensive CIP with Funding Strategy



# Risk Based Capital Planning



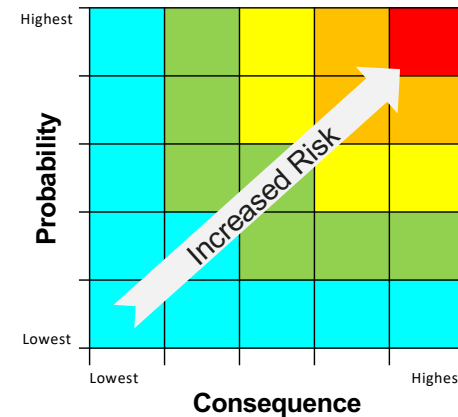
**Probability of Failure**

- Asset conditions and performance standards

**Consequence of Failure**

TBL Criteria

- Economic
- Environmental
- Social





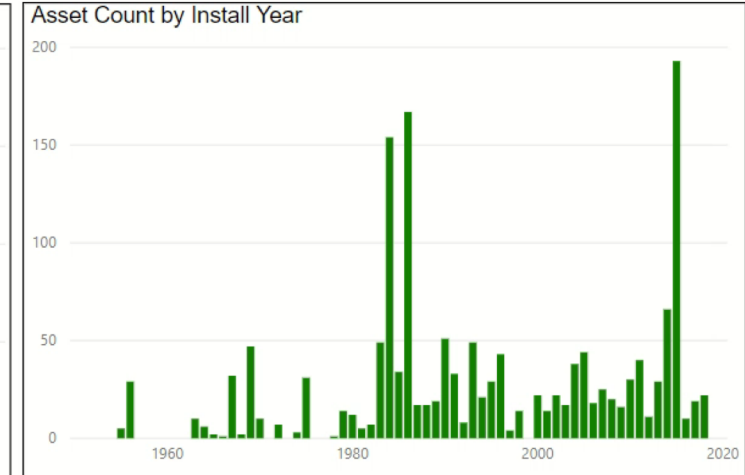
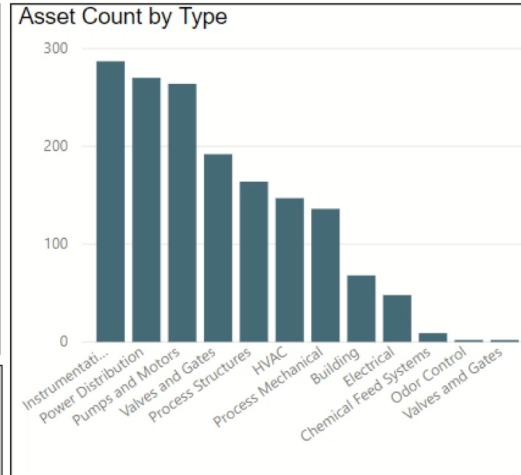
# Capital Planning

Elkhart WW Facilities Data v0.6 PBI v0.10 6/24/2019 6:22:13 AM

Arcadis Rehabilitation and Replacement Planning System **ARCADIS**

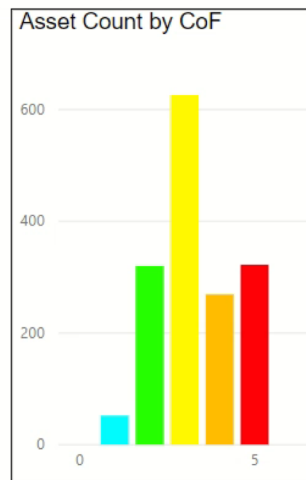
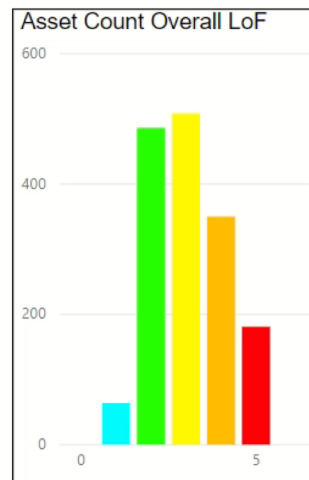
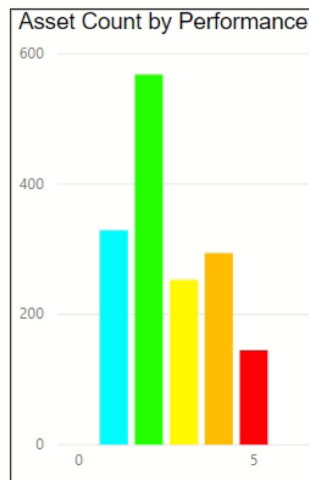
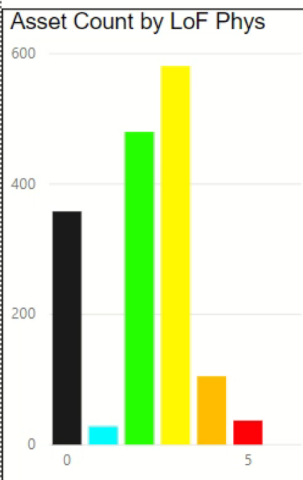
- Facilities**
- Select all
  - 8th & Franklin
  - Aeration Tanks
  - Aeroplex Park
  - Airport Road
  - American Countryside
  - Ames
  - Banks Ind. Park
  - Bay Street
  - Beardsley
  - Bridge Street

- Process**
- Select all
  - Admin Build...
  - Aeration
  - Aquatics Bui...
  - Belt Filter Pr...
  - Blowers
  - Cascade Aer...
  - Chemical Fe...
  - Digestion
  - East Electric...
  - East Mainte...



**\$114.3M**  
Total Replacement Cost

**1,589**  
Assets



**Risk Matrix**

LoF CoF	1	2	3	4	5	Total
5	3	30	84	28	36	181
4	5	55	153	84	53	350
3	17	96	189	84	122	508
2	17	120	175	65	109	486
1	10	19	25	8	2	64
<b>Total</b>	<b>52</b>	<b>320</b>	<b>626</b>	<b>269</b>	<b>322</b>	<b>1,589</b>

Inventory Physical<sup>x</sup> Performance CoF Risk Scenarios Compare Scenario Configuration +

# CASE STUDIES AND EXAMPLES



# Indianapolis Zoo Facilities

## Asset Management Program / Indianapolis Zoo, IN



80 Buildings  
1000 Facilities assets



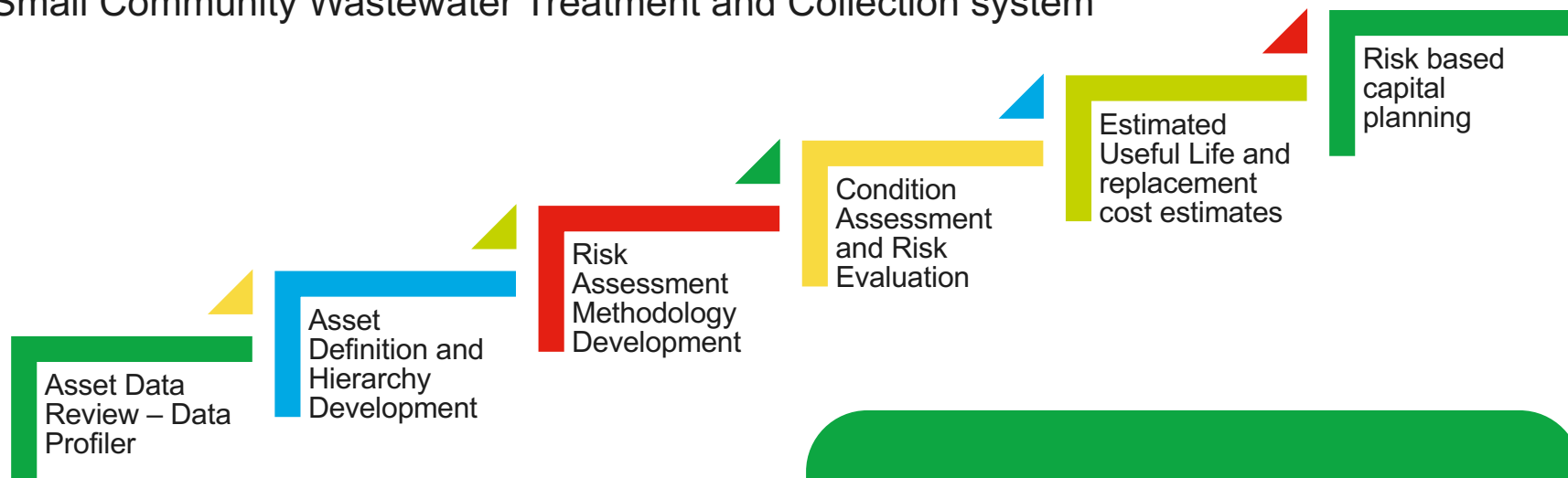
# Indianapolis Zoo - Outcomes

- ✓ Provided the Zoo with asset inventory and supporting attribute data
- ✓ Developed asset hierarchy, definition, and scoring criteria specific to zoo industry
- ✓ Developed a risk-based methodology to support capital planning
- ✓ Delivered a defensible CIP to ensure level of service to customers and revenue of zoo was not impacted by asset failure

# Bucyrus, Ohio

## Asset Management Program / City of Bucyrus, Ohio

Small Community Wastewater Treatment and Collection system



City has 100 km of sewer pipes

- One Wastewater Treatment Plant and three pump stations
- Approximately 200 assets

# Bucyrus, Ohio - Outcomes

- ✓ Right-sized approach for small client
- ✓ Trained staff on inventory and condition assessment
- ✓ Developed standardized risk methodology
- ✓ Roadmap and ongoing support for further program improvements

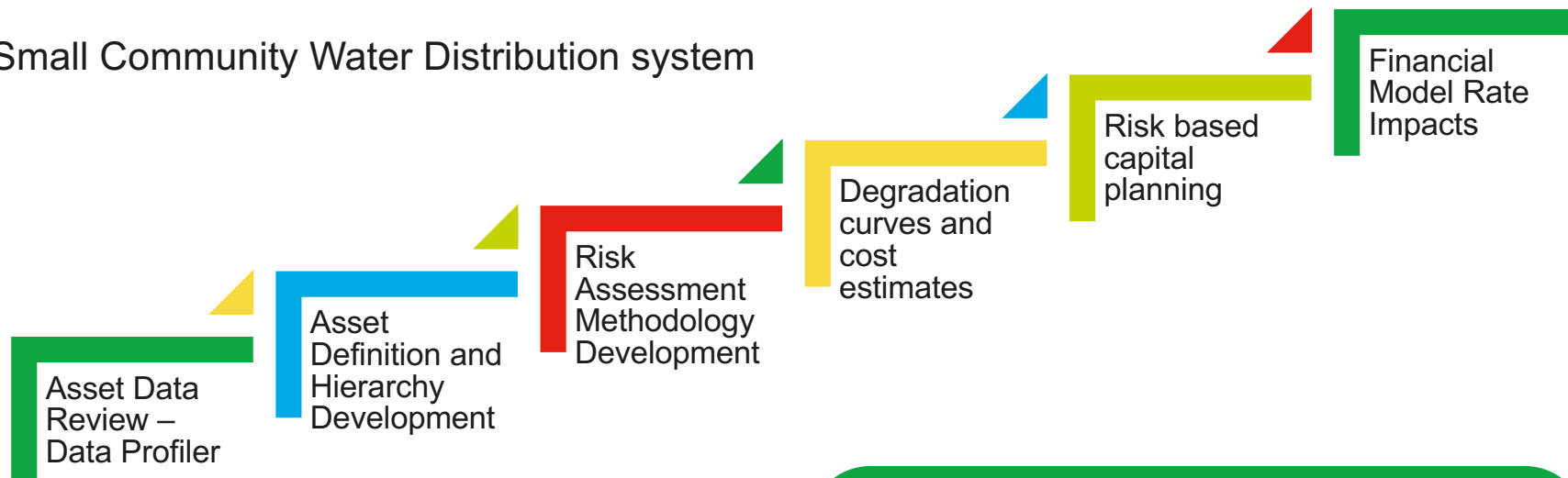
A	C	D	E	G	H	L	N	O	P	Q	R	S
Collection Assets	Facility (WWTP or Pump Station)	Facility Area	Equipment Group	Asset Type	Capacity	Manufacturer	Tag Number	Physical Condition Score	Performance Condition Score	MAX Cond.	Consequence of Failure Score	Redundancy Factor
<b>Crossroads Pump Station</b>												
> Pump Station Facility	Crossroads PS	Pumping	Building and Grounds	PROCESS STRUCTURE	50.25 sq ft (8' dia; 25.50' depth)	N/A	10807	1	2	2	3	
> Duplex Submersible Pumps	Crossroads PS	Pumping	Pumps and Motors	SUBMERSIBLE PUMP	0.8 MGD	Gorman-Rupp	10805	2	2	2	3	0.5
> Duplex Submersible Pumps	Crossroads PS	Pumping	Pumps and Motors	SUBMERSIBLE PUMP	0.8 MGD	Gorman-Rupp	10806	2	2	2	3	0.5
> MultiSmart Level Sensor/Controller	Crossroads PS	Pumping	Instrumentation and Control	LEVEL SENSOR	N/A	Multitrode	10804	1	2	2	2	
<b>Heritage Circle Pump Station</b>												
> Lift Station Facility	Heritage Circle PS	Pumping	Building and Grounds	PROCESS STRUCTURE	12.57 sq ft (4' dia; 22.2' depth)	N/A		1	2	2	3	
> Pump 1	Heritage Circle PS	Pumping	Pumps and Motors	PUMP	220 GPM	Verman	10802	1	2	2	3	0.5
> Pump 2	Heritage Circle PS	Pumping	Pumps and Motors	PUMP	220 GPM							
> Doppler Flow Meter	Heritage Circle PS	Pumping	Instrumentation and Control	FLOW METER	Model DFM 5.1							
> MultiSmart Level Sensor/Controller	Heritage Circle PS	Pumping	Instrumentation and Control	LEVEL SENSOR	N/A							
<b>Checkmate Pump Station</b>												
> Pump Station Facility	Checkmate PS	Pumping	Building and Grounds	PROCESS STRUCTURE	28.25 sq ft (6' dia; 15' depth)							
> Duplex Submersible Pumps	Checkmate PS	Pumping	Pumps and Motors	SUBMERSIBLE PUMP	1.25 MGD							
> Duplex Submersible Pumps	Checkmate PS	Pumping	Pumps and Motors	SUBMERSIBLE PUMP	1.25 MGD							
> MultiSmart Level Sensor/Controller	Checkmate PS	Pumping	Instrumentation and Control	LEVEL SENSOR	N/A							
<b>General Plant Facilities</b>												
> Administrative Building	WWTP	General Plant Facilities	Buildings and Grounds	BUILDING	2150 sf							
> MCC - MB1	WWTP	General Plant Facilities	Electrical	MCC								
> MCC - MB2	WWTP	General Plant Facilities	Electrical	MCC								
> Main Building Furnace	WWTP	General Plant Facilities	HVAC	FURNACE								
> Main Building A/C Unit	WWTP	General Plant Facilities	HVAC	AC UNIT	34800 btu/hr							
> Lab Furnace/Air Unit	WWTP	General Plant Facilities	HVAC	AC UNIT	80,000 btu/hr							
> Admin Garage Hanging Heater	WWTP	General Plant Facilities	HVAC	UNIT HEATER								
> Perimeter Fence	WWTP	General Plant Facilities	Buildings and Grounds	GROUND								
> Garage (Old Chlorine Building)	WWTP	General Plant Facilities	Buildings and Grounds	BUILDING	1118 sf							
> Main Garage	WWTP	General Plant Facilities	Buildings and Grounds	BUILDING	2592 sf							
> Garage Furnace	WWTP	General Plant Facilities	HVAC	FURNACE								
> Standby Power Generator	WWTP	General Plant Facilities	Electrical	GENERATOR	350 KW							
> Generator Distribution Panel	WWTP	General Plant Facilities	Electrical	PANELBOARD								
> Auto Dialer	WWTP	General Plant Facilities	Instrumentation and Control	INSTRUMENT								
> Chart Recorder	WWTP	General Plant Facilities	Instrumentation and Control	FLOW METER	Model 6180A							
> Transfer Switch	WWTP	General Plant Facilities	Electrical	TRANSFER SWITCH								
<b>Influent Pumping</b>												
> Bypass Meter Valve	WWTP	Influent Pumping	Valves and Gates	MANUAL VALVE	14"							



# Steubenville, Ohio

## Asset Management Program / City of Steubenville, Ohio

Small Community Water Distribution system

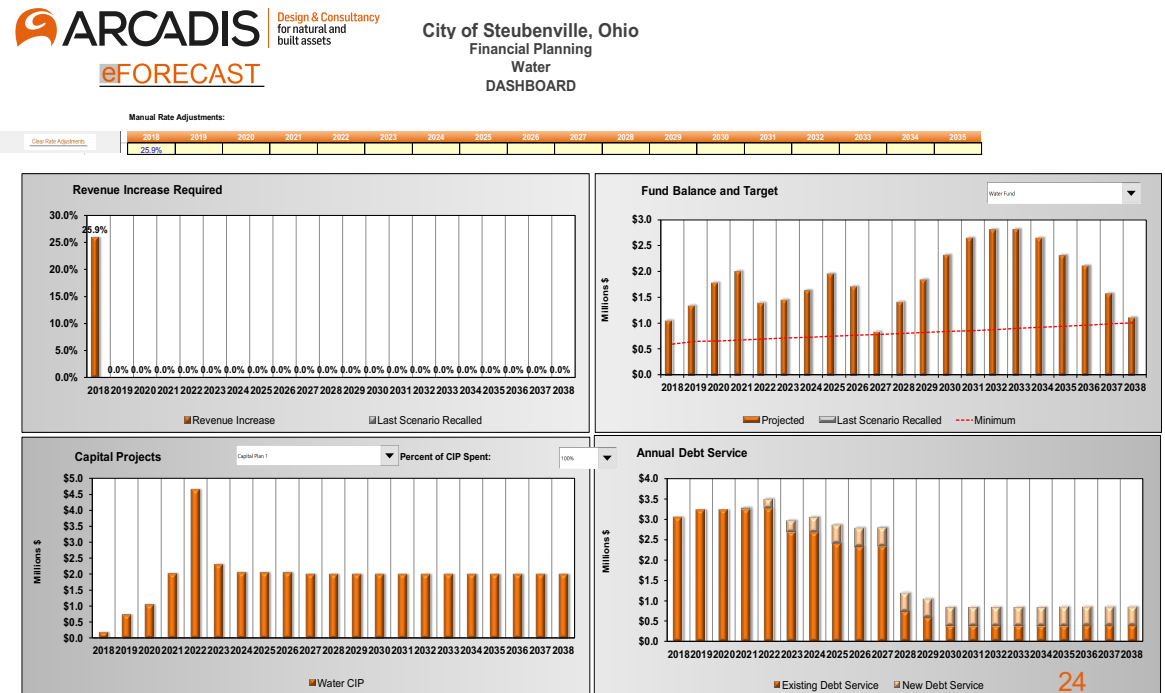


City has 150 km of water mains

# Steubenville, Ohio - Outcomes

- ✓ Gaps identified in GIS and critical asset management gaps were closed
- ✓ Risk based capital planning performed for linear assets
- ✓ Capital planning analysis fed into financial model to determine long term funding and rate impacts
- ✓ Compliance with state regulations

Data Type	Initial % Complete	Final Data % Complete
Diameter	24 %	96 %
Material	7 %	83 %
Install Decade	22 %	81 %



# Thank you for attending!



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