Des Moines Water Works
2040 Long Range Plan

September 2017

Des Moines Water Works

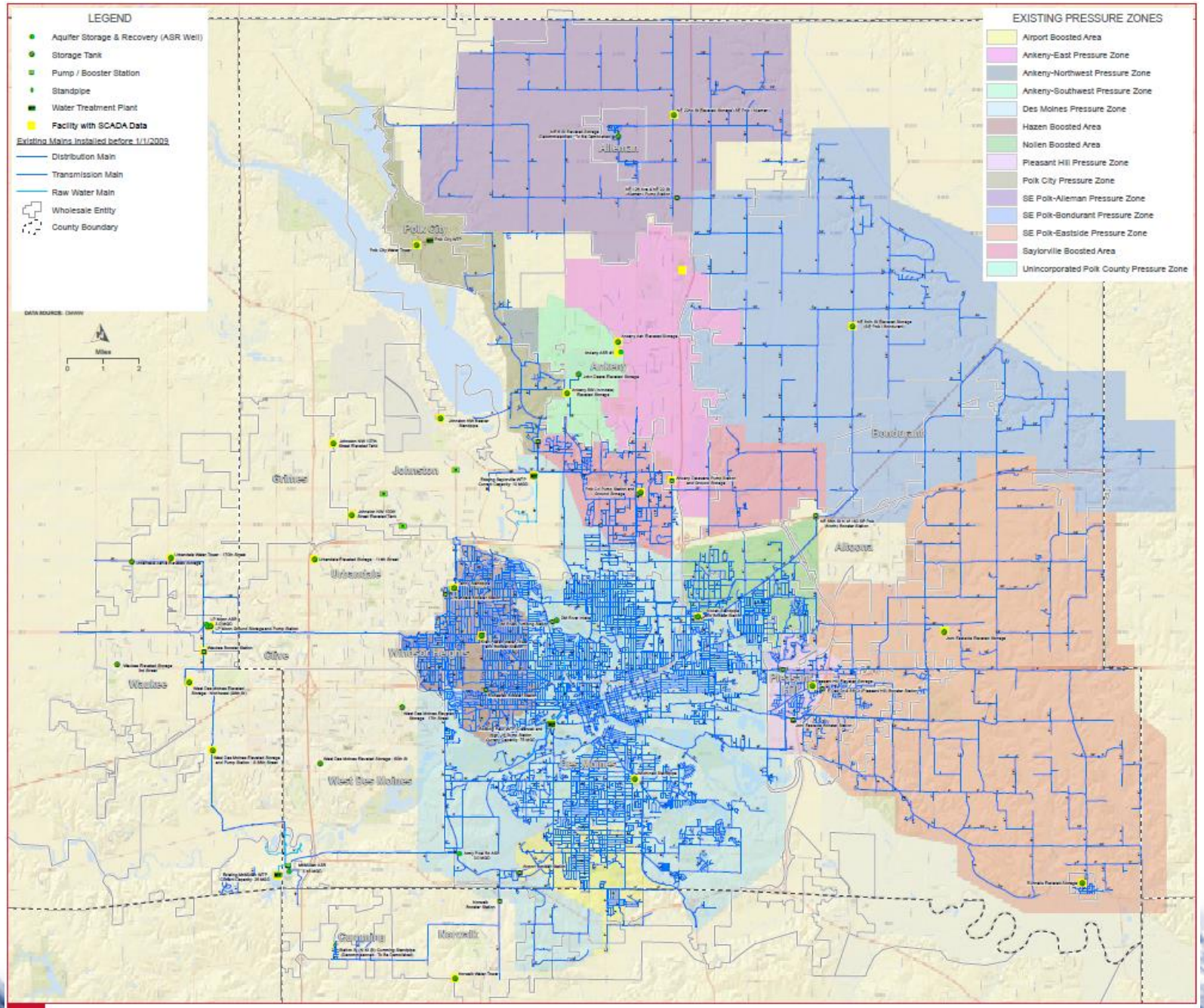
Water You Can Trust for Life

Process

- Previous plan completed by DMWW
  - 2009 Long Range Plan for improvements to 2020
- Current Plan
  - Assistance from HDR and CH2M
  - CIRDWC Population and Water Demand Projections
  - Review customer connections
  - Evaluate source water, treatment, and distribution
  - Developed staged implementation plan through the year 2040
- Recommended improvements in a staged plan for the years 2020, 2025, 2030, 2035, and 2040
- Improvements are also tied to peak demands

Plan Service Areas

Community Name	Service Area Type
Altoona	Wholesale Customer
Ankeny	Wholesale Customer
Berwick	Total Service
Bondurant	Wholesale Customer
Clive	Wholesale Customer
Cumming	Total Service
Des Moines	DMWW Owned and Operated
Grimes	Wholesale Customer (Anticipated Future)
Johnston	Wholesale Customer
Norwalk	Wholesale Customer
Pleasant Hill	Total Service
Polk City	Wholesale Customer
Runnells	Total Service
Polk County / Southeast Polk Rural Water District (SE Polk)	DMWW Owned and Operated
Urbandale	Wholesale Customer
Warren County	DMWW Owned and Operated
Warren County Water District	Wholesale Customer
Waukee	Wholesale Customer
West Des Moines	Wholesale Customer
Windsor Heights	Total Service
Xenia Rural Water District	Wholesale Customer

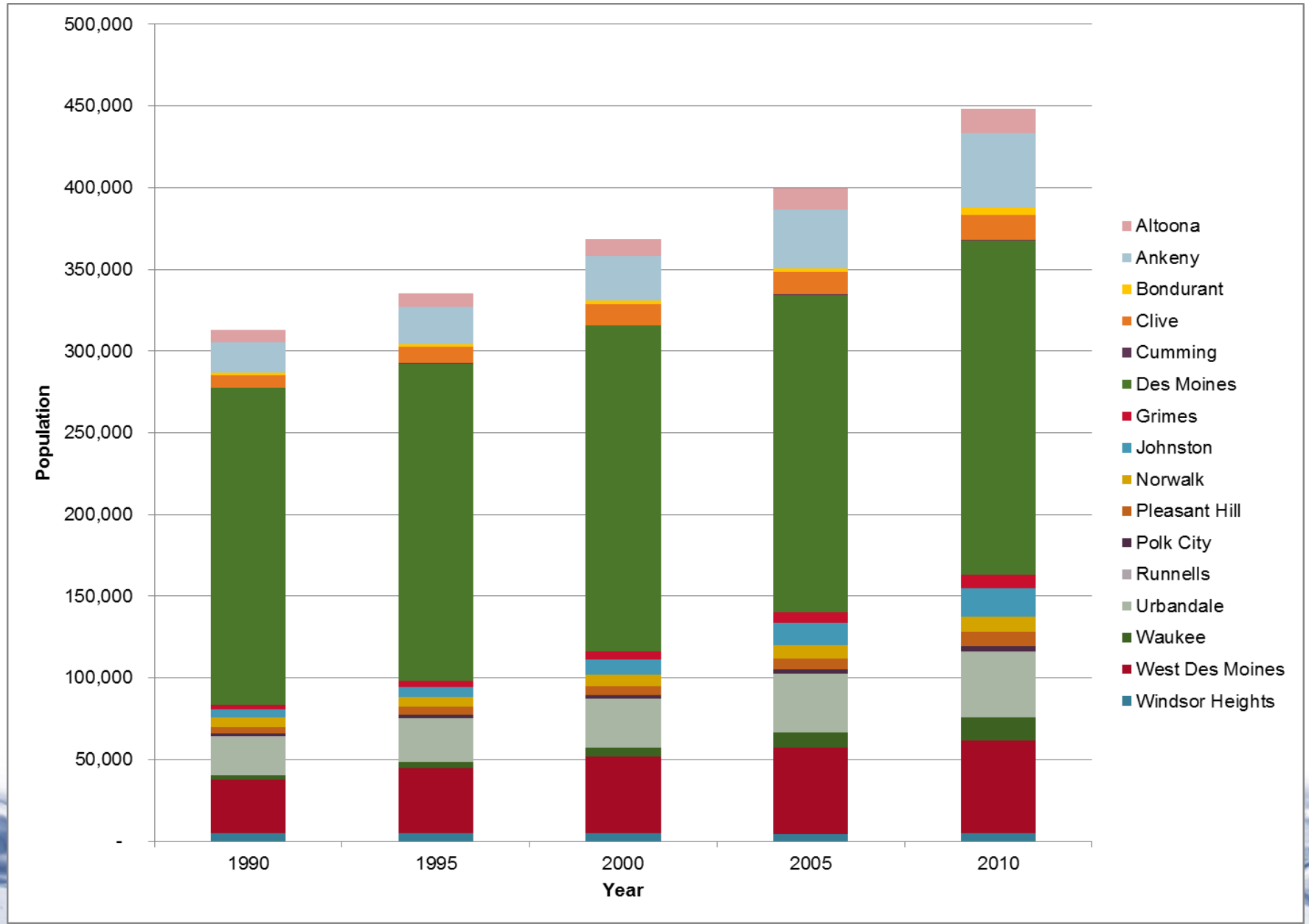


HDR ch2m Des Moines Water Works

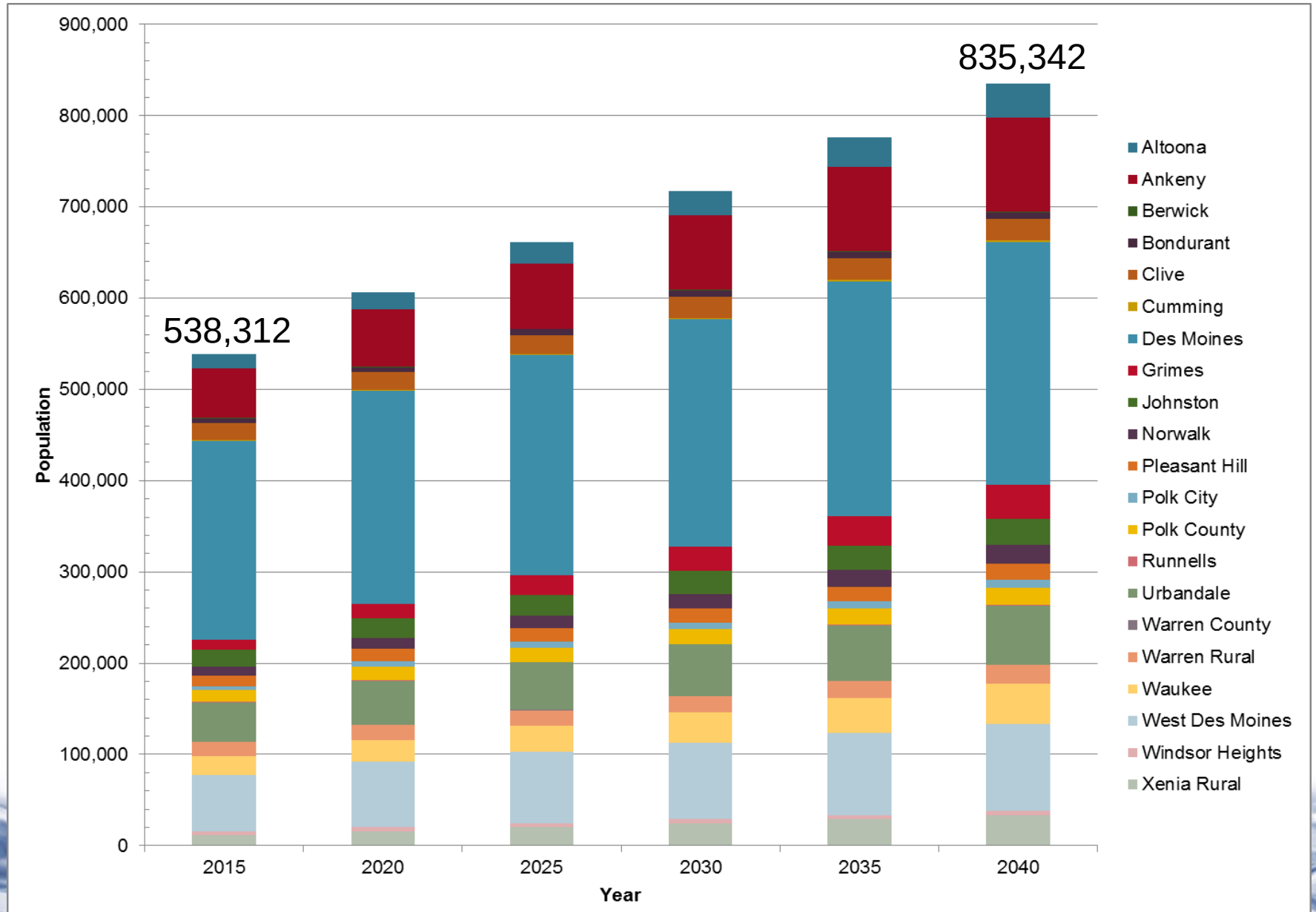
Service Areas

EXISTING SYSTEM

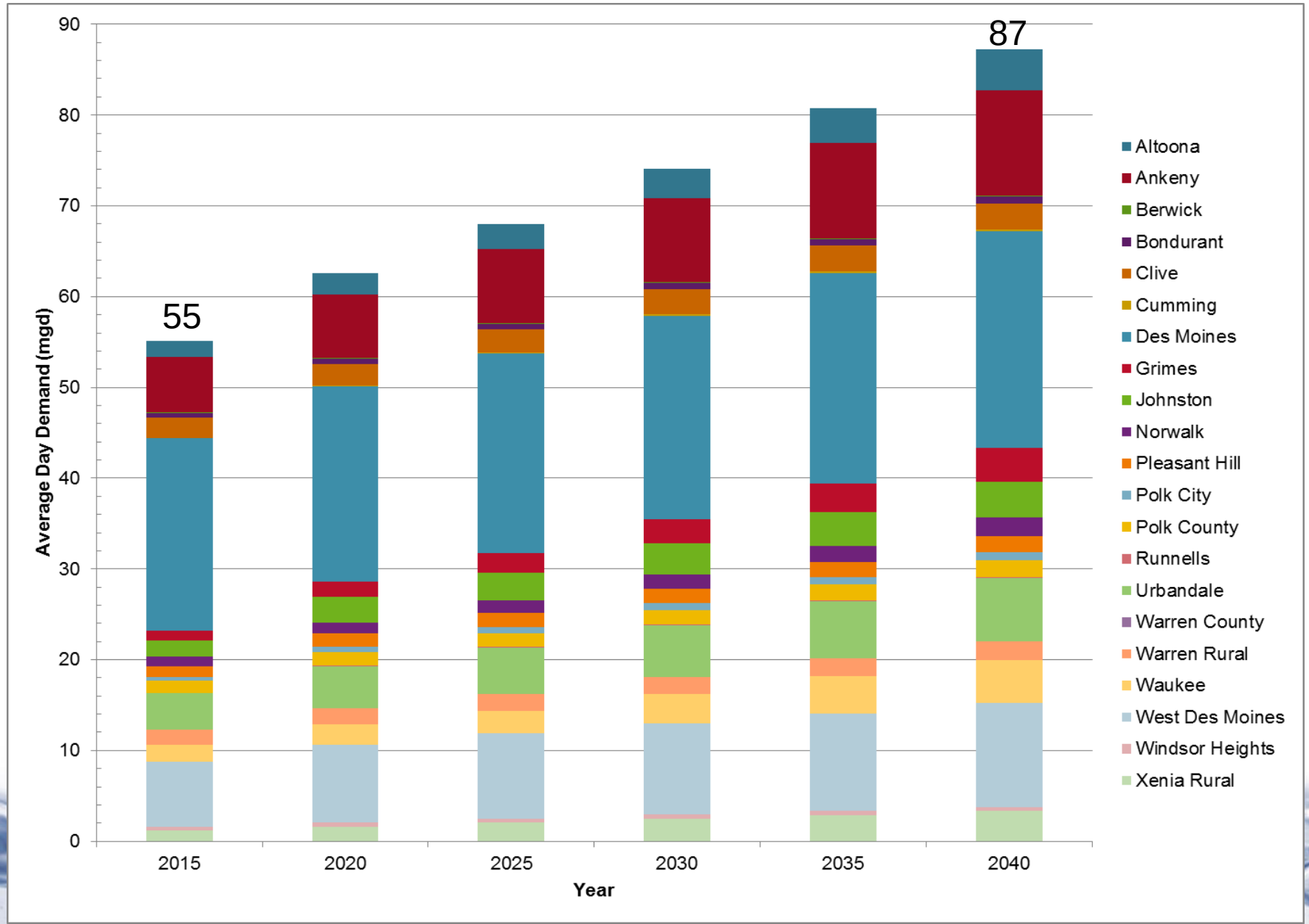
Metro Area Historic Population



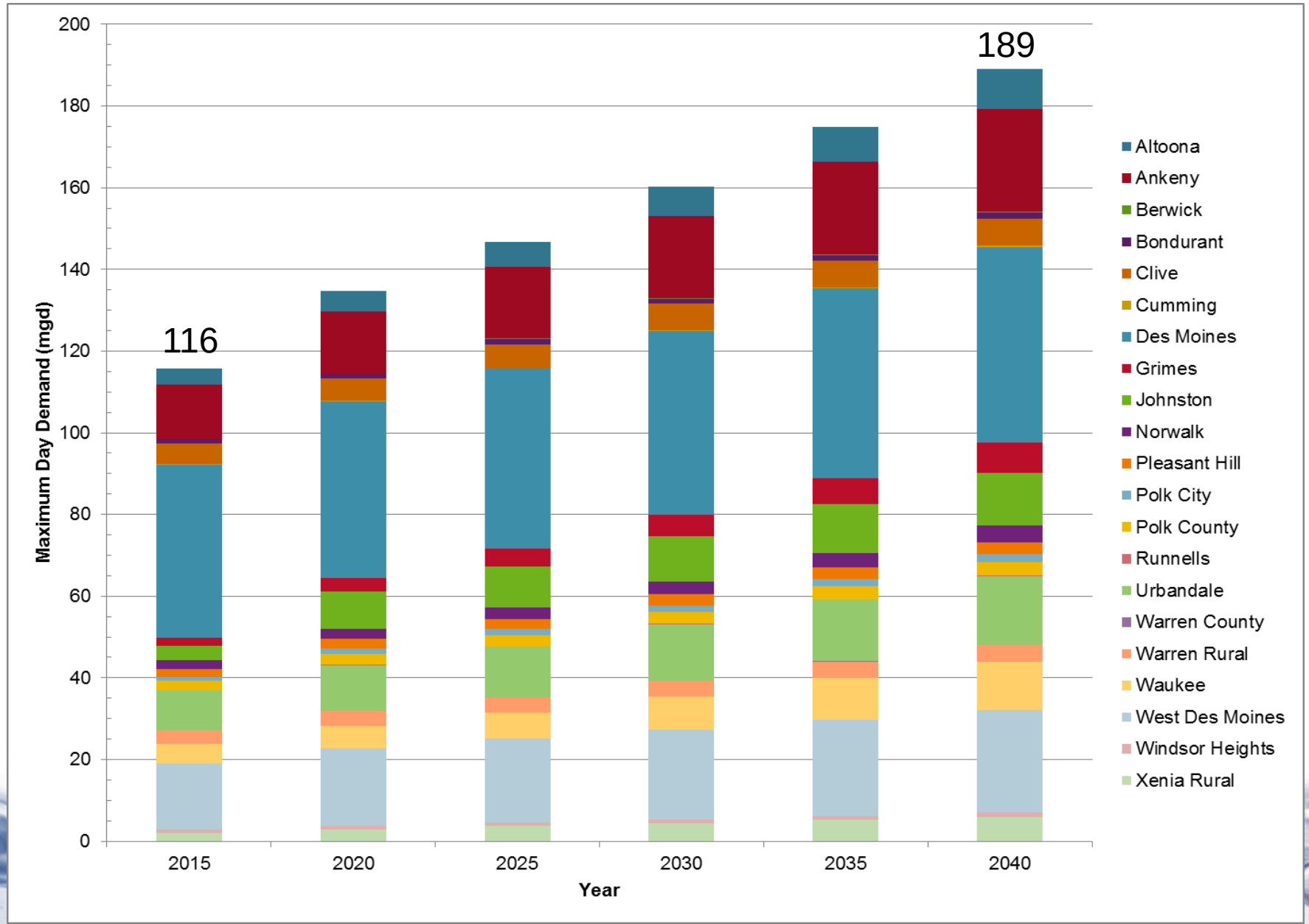
Service Area Population Projections



Projected Average Day Demand



Projected Max Day Demand



Treatment Facility Summary

Facility Name	Owner	Capacity
Fleur WTP	DMWW	75 mgd
McMullen WTP	DMWW	25 mgd
Saylorville WTP	DMWW	10 mgd
Altoona WTP	City of Altoona	4 mgd
Grimes WTP	City of Grimes	3.5 mgd
Polk City WTP[1]	City of Polk City	0.3 mgd
A.C. Ward WTP	West Des Moines Water Works	10 mgd
Urbandale WTP[2]	Urbandale	8 mgd
Xenia Rural WTP[3]	Xenia Rural	0.8 to 1.6 mgd

Notes:

[1]Anticipated be abandoned by 2035

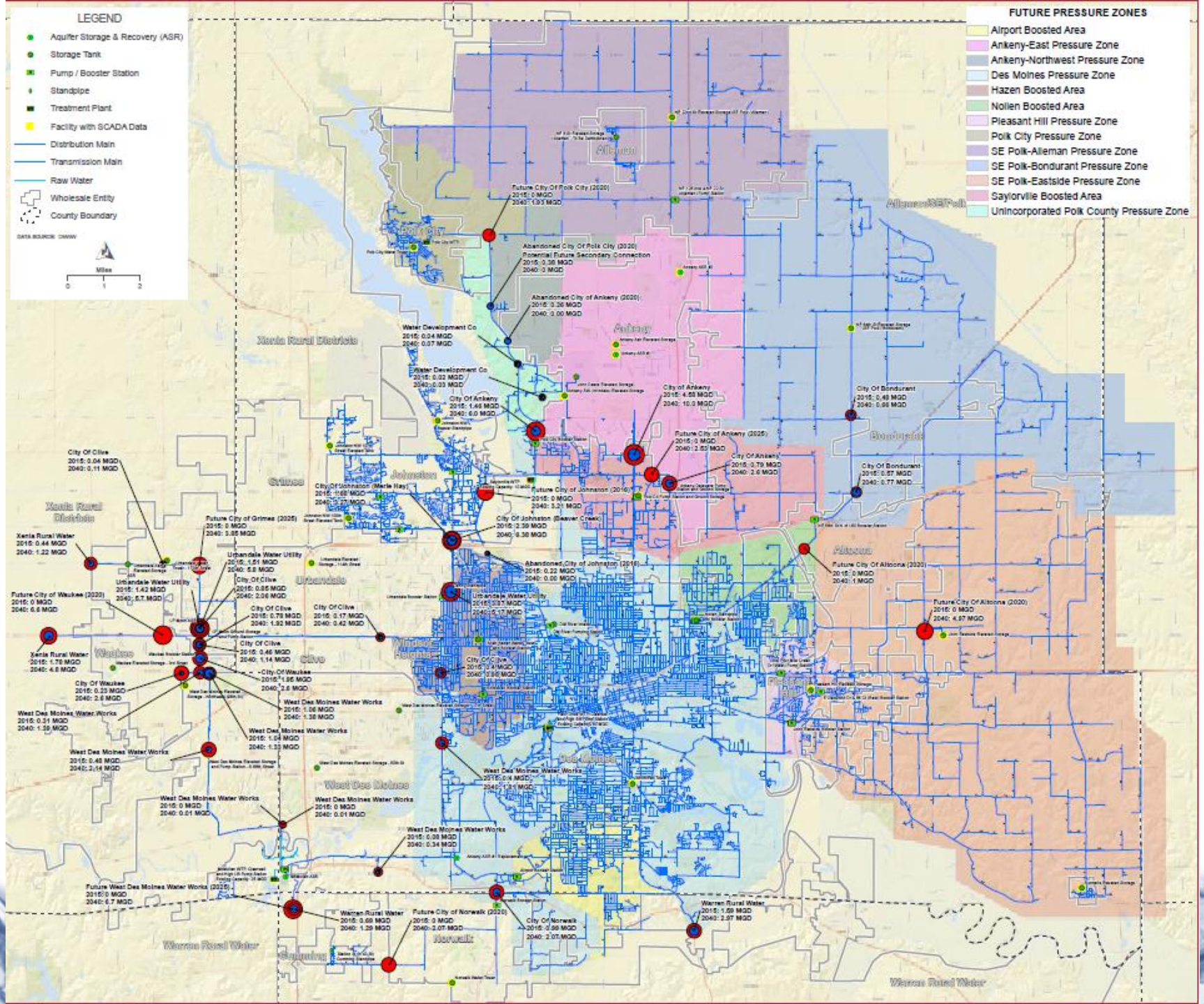
[2]The future of this WTP is unknown at this time, and alternatives for expanding WTP capacity with, and without the Urbandale WTP will be carried forward as part of this project

[3]Beginning production at 0.8 mgd in 2035, and increasing to 1.6 mgd in 2040

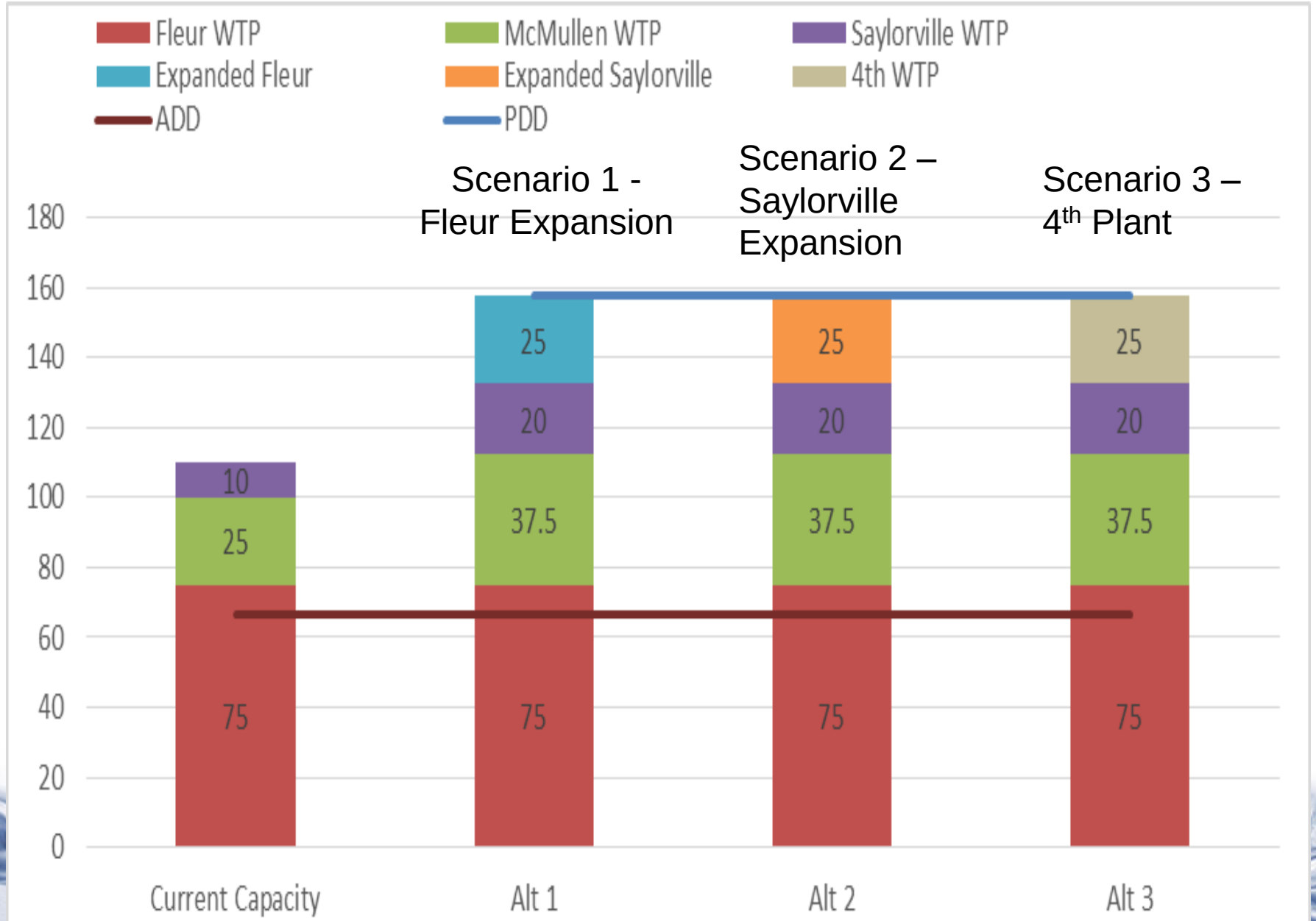
Production Facility Requirements

Description	*2015*	*2020*	*2025*	*2030*	*2035*	*2040*
Total Maximum Day Demand	116.0	134.8	146.7	160.2	175.0	189.1
Production Buffer	10.0	10.0	10.0	10.0	10.0	10.0
Production of Connected Wholesale Customers	16.7	17.8	17.8	17.8	18.2	19.0
ASR Production Capacity (Firm)	4.1 to 7.1	13.1 to 16.1	15.7 to 18.7	15.7 to 18.7	18.5 to 21.5	21.5 to 24.5
DMWW Production Capacity Required	102.2 to 105.2	110.9 to 113.9	119.7 to 122.7	133.2 to 136.2	144.8 to 147.8	155.6 to 158.6
Existing DMWW Production Capacity	110.0	110.0	110.0	110.0	110.0	110.0
Additional DMWW Production Capacity Required	**0.0**	**0.9 to 3.9**	**10.2 to 13.2**	**23.7 to 26.7**	**35.3 to 38.3**	**45.6 to 48.6**

47.5 mgd


LEGEND
Aquifer Storage & Recovery (ASR)
Storage Tank
Pump / Booster Station
Standpipe
Treatment Plant
Facility with SCADA Data
Distribution Main
Transmission Main
Raw Water
Wholesale Entity
County Boundary
DATA SOURCE: CWWW
Miles
0
1
2
FUTURE PRESSURE ZONES
Airport Boosted Area
Ankeny-East Pressure Zone
Ankeny-Northwest Pressure Zone
Des Moines Pressure Zone
Hazen Boosted Area
Nollen Boosted Area
Pleasant Hill Pressure Zone
Polk City Pressure Zone
SE Polk-Alleman Pressure Zone
SE Polk-Bondurant Pressure Zone
SE Polk-Eastside Pressure Zone
Saylorville Boosted Area
Unincorporated Polk County Pressure Zone
Alleman
Polk City
Ankeny
Xenia Rural Districts
Grimes
Johnston
Urbandale
Clive
Windsor Heights
Waukee
West Des Moines
Des Moines
Pleasant Hill
Altoona
Bondurant
Norwalk
Warren Rural Water
Future City Of Polk City (2020)
2015: 0 MGD
2040: 1.93 MGD
Abandoned City Of Polk City (2020)
Potential Future Secondary Connection
2015: 0.36 MGD
2040: 0 MGD
Abandoned City of Ankeny (2020)
2015: 0.36 MGD
2040: 0.00 MGD
Water Development Co
2015: 0.04 MGD
2040: 0.07 MGD
Water Development Co
2015: 0.02 MGD
2040: 0.03 MGD
City Of Ankeny
2015: 1.46 MGD
2040: 6.0 MGD
City of Ankeny
2015: 4.55 MGD
2040: 10.0 MGD
Future City of Ankeny (2025)
2015: 0 MGD
2040: 2.53 MGD
City Of Ankeny
2015: 0.79 MGD
2040: 2.6 MGD
City Of Bondurant
2015: 0.48 MGD
2040: 0.98 MGD
City Of Bondurant
2015: 0.57 MGD
2040: 0.77 MGD
City Of Johnston (Merle Hay)
2015: 1.68 MGD
2040: 3.27 MGD
Future City of Johnston (2016)
2015: 0 MGD
2040: 3.21 MGD
City Of Johnston (Beaver Creek)
2015: 2.36 MGD
2040: 6.36 MGD
Abandoned City of Johnston (2016)
2015: 0.22 MGD
2040: 0.00 MGD
Future City of Grimes (2025)
2015: 0 MGD
2040: 3.85 MGD
Urbandale Water Utility
2015: 1.51 MGD
2040: 5.0 MGD
Urbandale Water Utility
2015: 1.42 MGD
2040: 5.7 MGD
Urbandale Water Utility
2015: 3.17 MGD
2040: 5.17 MGD
City Of Clive
2015: 0.04 MGD
2040: 0.11 MGD
City Of Clive
2015: 0.85 MGD
2040: 2.06 MGD
City Of Clive
2015: 0.78 MGD
2040: 1.92 MGD
City Of Clive
2015: 0.17 MGD
2040: 0.42 MGD
City Of Clive
2015: 0.46 MGD
2040: 1.14 MGD
City Of Clive
2015: 0.94 MGD
2040: 0.96 MGD
City Of Clive
2015: 1.35 MGD
2040: 2.6 MGD
Future City Of Altoona (2020)
2015: 0 MGD
2040: 1 MGD
Future City Of Altoona (2020)
2015: 0 MGD
2040: 4.97 MGD
Xenia Rural Water
2015: 0.44 MGD
2040: 1.22 MGD
Future City of Waukee (2020)
2015: 0 MGD
2040: 6.6 MGD
Xenia Rural Water
2015: 1.78 MGD
2040: 4.8 MGD
City Of Waukee
2015: 0.23 MGD
2040: 2.6 MGD
West Des Moines Water Works
2015: 0.31 MGD
2040: 1.39 MGD
West Des Moines Water Works
2015: 1.06 MGD
2040: 1.38 MGD
West Des Moines Water Works
2015: 1.04 MGD
2040: 1.33 MGD
West Des Moines Water Works
2015: 0.48 MGD
2040: 2.14 MGD
West Des Moines Water Works
2015: 0 MGD
2040: 0.01 MGD
West Des Moines Water Works
2015: 0 MGD
2040: 0.01 MGD
West Des Moines Water Works
2015: 0.08 MGD
2040: 0.34 MGD
West Des Moines Water Works
2015: 0.4 MGD
2040: 1.91 MGD
Future West Des Moines Water Works (2025)
2015: 0 MGD
2040: 6.7 MGD
Warren Rural Water
2015: 0.69 MGD
2040: 1.29 MGD
Future City of Norwalk (2020)
2015: 0 MGD
2040: 2.07 MGD
City Of Norwalk
2015: 0.99 MGD
2040: 2.07 MGD
Warren Rural Water
2015: 1.59 MGD
2040: 2.97 MGD

Future Production Capacity Alternatives



Base Improvements

- Improvements to maintain
  Fleur Drive

- Three new ASR wells

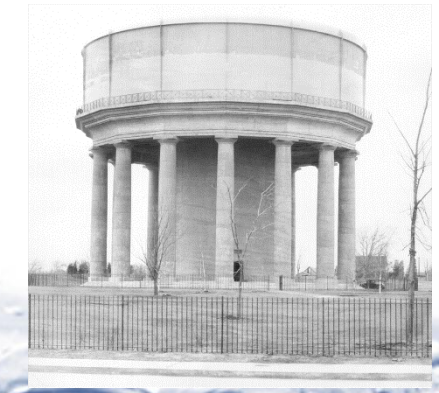
- Expansion of Saylorville
  WTP to 20 mgd

Base Improvements

- Expansion of McMullen WTP to 37.5 mgd

- Pumping Improvements

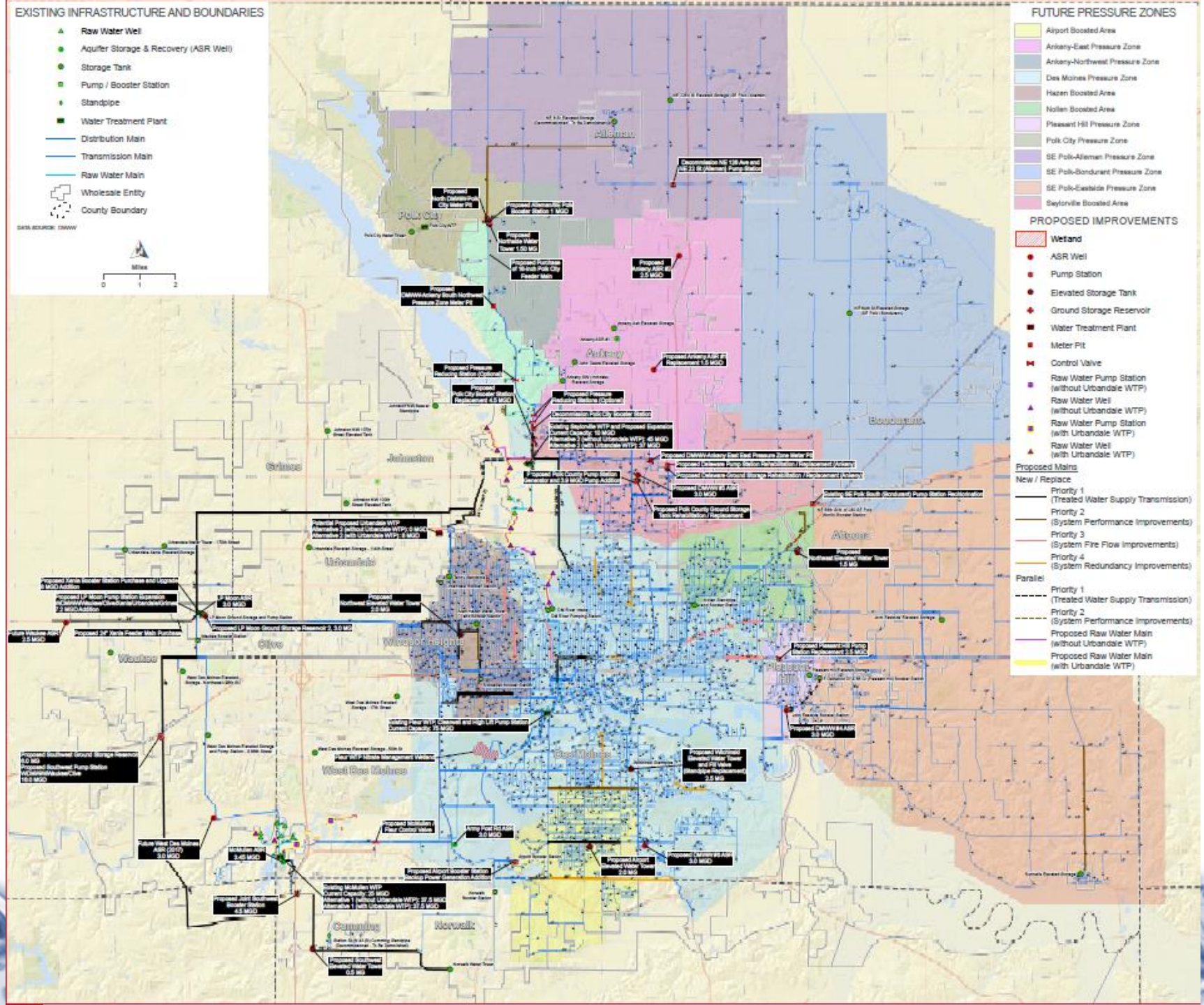
- Storage Improvement



- Base improvements include approximately 68 miles of transmission improvements.

Non-Economic Evaluation

Fleur Expansion	Saylorville Expansion	4th Plant
Least cost	Middle cost	Highest cost
Flooding potential for plant to be off line, but can maintain ADD in 2040 with plant out of service	Out of flood plain	Out of flood plain
Diverse source waters and direct surface water intakes	Only Des Moines River watershed, UF/RO limits surface intake w/o added treatment	Only Des Moines River watershed, can plan for direct surface intake
Site restrictions make additional treatment harder & more costly	Able to use existing RO for nitrate treatment	Similar water quality to McMullen
Increased reliance on one plant	Open site makes future changes easier to incorporate	Land acquisition may be problematic
21 miles of additional distribution pipe	24 miles of additional distribution pipe	18 miles of additional distribution pipe


EXISTING INFRASTRUCTURE AND BOUNDARIES
Raw Water Well
Aquifer Storage & Recovery (ASR Well)
Storage Tank
Pump / Booster Station
Standpipe
Water Treatment Plant
Distribution Main
Transmission Main
Raw Water Main
Wholesale Entity
County Boundary
DATA SOURCE: DMWW
Miles
0
1
2
FUTURE PRESSURE ZONES
Airport Boosted Area
Ankeny-East Pressure Zone
Ankeny-Northwest Pressure Zone
Des Moines Pressure Zone
Hazen Boosted Area
Nollen Boosted Area
Pleasant Hill Pressure Zone
Polk City Pressure Zone
SE Polk-Alleman Pressure Zone
SE Polk-Bondurant Pressure Zone
SE Polk-Eastside Pressure Zone
Saylorville Boosted Area
PROPOSED IMPROVEMENTS
Wetland
ASR Well
Pump Station
Elevated Storage Tank
Ground Storage Reservoir
Water Treatment Plant
Meter Pit
Control Valve
Raw Water Pump Station (without Urbandale WTP)
Raw Water Well (without Urbandale WTP)
Raw Water Pump Station (with Urbandale WTP)
Raw Water Well (with Urbandale WTP)
Proposed Mains
New / Replace
Priority 1 (Treated Water Supply Transmission)
Priority 2 (System Performance Improvements)
Priority 3 (System Fire Flow Improvements)
Priority 4 (System Redundancy Improvements)
Parallel
Priority 1 (Treated Water Supply Transmission)
Priority 2 (System Performance Improvements)
Proposed Raw Water Main (without Urbandale WTP)
Proposed Raw Water Main (with Urbandale WTP)
Alleman
Polk City
Ankeny
Bondurant
Grimes
Johnston
Urbandale
Altoona
Clive
Windsor Heights
West Des Moines
Pleasant Hill
Carlisle
Norwalk

Phased Capital Improvement Plan Summary for Core Network Projects Affecting All Entities

	Scenario 1A	Scenario 1B	Scenario 2A	Scenario 2B	Scenario 3A	Scenario 3B
	Fleur Expansion without Urbandale WTP	Fleur Expansion with Urbandale WTP	Saylorville Expansion without Urbandale WTP	Saylorville Expansion with Urbandale WTP	4th WTP without Urbandale WTP	4th WTP with Urbandale WTP
Supply	$157,670,000	$149,050,000	$158,470,000	$150,530,000	$167,460,000	$158,430,000
Treatment	$126,820,000	$126,820,000	$202,890,000	$185,260,000	$226,870,000	$209,040,000
Distribution	$54,290,000	$48,140,000	$36,790,000	$33,730,000	$53,910,000	$47,690,000
Storage	$7,380,000	$7,380,000	$7,380,000	$7,380,000	$7,380,000	$7,380,000
Pumping	$1,200,000	$1,200,000	$1,200,000	$1,200,000	$1,200,000	$1,200,000
ASR	$20,570,000	$20,570,000	$20,570,000	$20,570,000	$20,570,000	$20,570,000
TOTAL	**$367,930,000**	**$353,160,000**	**$427,300,000**	**$398,670,000**	**$477,390,000**	**$444,310,000**

Phased Capital Improvement Plan Summary for Core Network Projects Affecting Some Entities

	Scenario 1A	Scenario 1B	Scenario 2A	Scenario 2B	Scenario 3A	Scenario 3B
	Fleur Expansion without Urbandale WTP	Fleur Expansion with Urbandale WTP	Saylorville Expansion without Urbandale WTP	Saylorville Expansion with Urbandale WTP	4th WTP without Urbandale WTP	4th WTP with Urbandale WTP
Supply	$0	$0	$0	$0	$0	$0
Treatment	$0	$0	$0	$0	$0	$0
Distribution	$63,950,000	$63,950,000	$75,120,000	$75,120,000	$51,260,000	$51,260,000
Storage	$21,710,000	$21,710,000	$21,710,000	$21,710,000	$21,710,000	$21,710,000
Pumping	$13,940,000	$13,940,000	$13,940,000	$13,940,000	$13,940,000	$13,940,000
ASR	$0	$0	$0	$0	$0	$0
TOTAL	**$99,600,000**	**$99,600,000**	**$110,770,000**	**$110,770,000**	**$86,910,000**	**$86,910,000**

Phased Capital Improvement Plan Summary for Projects Affecting DMWW and Total Service Areas

	Scenario 1A	Scenario 1B	Scenario 2A	Scenario 2B	Scenario 3A	Scenario 3B
	Fleur Expansion without Urbandale WTP	Fleur Expansion with Urbandale WTP	Saylorville Expansion without Urbandale WTP	Saylorville Expansion with Urbandale WTP	4th WTP without Urbandale WTP	4th WTP with Urbandale WTP
Supply	$0	$0	$0	$0	$0	$0
Treatment	$0	$0	$0	$0	$0	$0
Distribution	$23,100,000	$23,100,000	$23,100,000	$23,100,000	$23,100,000	$23,100,000
Storage	$13,340,000	$13,340,000	$13,340,000	$13,340,000	$13,340,000	$13,340,000
Pumping	$2,590,000	$2,590,000	$2,590,000	$2,590,000	$2,590,000	$2,590,000
ASR	$0	$0	$0	$0	$0	$0
TOTAL	**$39,030,000**	**$39,030,000**	**$39,030,000**	**$39,030,000**	**$39,030,000**	**$39,030,000**

Schedule

- Incorporating final comments from CIRDWC Tech and DMWW into report
- Schedule is to have the Board of Water Works Trustees receive and file final report on September 26, 2017

Questions?

Des Moines Water Works

Water You Can Trust for Life

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