Work Session

The City Council of the City of Norfolk, Nebraska, held a work session in the Council Chambers, 309 North 5th Street, Norfolk, Nebraska, on Thursday, October 19, 2023, beginning at 4:00 p.m.

Mayor Josh Moenning called the meeting to order.

Roll call found the following present: Mayor Josh Moenning, Frank Arens, Corey Granquist, Kory Hildebrand, Thad Murren. Absent: Shane Clausen, Andrew McCarthy, Justin Snorton and Justin Webb.

Staff members present were City Administrator Andy Colvin, City Clerk Brianna Duerst, City Engineer Steven Rames, City Finance Officer Randy Gates, Economic Development Director Candice Alder, Wastewater Plant Supervisor Rob Huntley, Utility Project Manager Dennis Watts, Assistant City Engineer Anna Allen, Communications Manager Nick Stevenson, Police Chief Don Miller, Director of Administrative Services Lyle Lutt and Administrative Secretary Bethene Hoff.

Mayor Moenning presided and the City Clerk recorded the proceedings.

The Mayor informed the public about the location of the current copy of the Open Meetings Act accessible to members of the public.

Black and Veatch and Olsson presentation on Water and Sewer Master Planning

Public Works Director Steven Rames said the city's water, sewer, and wastewater plant master plans would be presented and invited Shawn LaBonde with Black & Veatch to present the water and sewer master plans.

Shawn LaBonde, Black & Veatch, reviewed water and sewer master planning and discussed the master planning service area and growth and area population projections. LaBonde reviewed water system planning and capital improvements highlighting water system data, a hydraulic model update, water system evaluations, water demand projections, per capita water use rates, development area population projections, west water treatment plant improvements and primary water system recommended improvements.

Primary water system recommended improvements include the following:

1) West Water Treatment Plant (WTP) Improvements (2024-25), which expands West WTP and West Well Field to 14.5 mgd, and includes expanded zone 1 & 2 pumps, 2.0 million gallon tank and Well 14 Collector Well – estimated cost is $15.9 million.
2) Zone 1 Transmission Main Expansion (post 2031), which provides improved water service access to southeast area, and includes 4.6 miles of 20-inch pipe – estimated cost is $12 million.

3) Zone 1 Storage Expansion (by 2030), which provides necessary storage to meet peak hour demand, and includes a 1-million-gallon tank at 25th St & Prospect Ave – estimated cost is $3.5 million.
4) Zone 5 Service Expansion (development dependent), which provides service to eastern development areas including Woodland Park and includes a Zone 5 pump station and 4.3 miles of 12, 16, and 20-inch pipe – estimated cost is $11 million.
5) Zone 3 Service Expansion (development dependent), which provides service to northwest development areas, and includes a Zone 3 pump station and 4 miles of 12-16-inch pipe – estimated cost is $9.8 million.
6) Zone 4 NE Loop (development dependent), which provides looped service to northeast industrial zoned area, and includes 1.2 miles of 16-inch pipe – estimated cost is $2.5 million.

Regarding the per capita water use rates, Councilman Granquist asked how we project being much higher in the future, when current population increases have not had much of an effect. LaBonde explained that, in that period, even though the population was increasing, the per capita usage was going down due to conservation and flow plumbing fixtures. When projecting future use, we don't think the lower per capita water usage will continue due to hitting the "conservation floor." LaBonde also noted that industrial use is hard to project.

Brian Friedrichsen, Olsson, reviewed the Omaha Avenue Lift Station, Force Main, and Gravity Sewer Improvements. Studies were completed in 2015, 2017 and 2019, and initial design was completed in 2018, which includes abandoning bypass lift station 275. The easement acquisitions for the Omaha Avenue Lift Station project are nearly complete. The original cost opinion for the project in 2016 was $5 million. The current cost estimate is $9.1 million due to increases in construction costs. Friedrichsen discussed the pros and cons of the Omaha Avenue Lift Station. Pros of the Omaha Avenue Lift Station include increased capacity for future growth and peak flows, the service area is shovel ready, removes lift station from NDOT right of way, increases capacity in North and West Norfolk, and back-up risk control systems. Cons of the Omaha Avenue Lift Station include a rate increase for the project.

Angel Lowery, Olsson Wastewater Engineer, discussed the Water Pollution Control Plant Master Plan. Lowery noted the current plant has not seen an expansion in 30 years with some equipment dating back to 1960's. The master plan was separated into five sections – analysis, water reuse evaluation, five-year plan, ten-year plan, and twenty-year plan. The plan was developed using population and industrial projections, potential future regulatory impacts, projected flows and organic loadings, unit process analysis, biowin plant modeling, and building and equipment operation and maintenance.

The master plan was broken down into three recommended phases:

- 5 year plan – improvements that should be made for smooth plant operation including upgrading the grit system process, north lift station rehab, nonpotable water system, odor control and biosolids studies, approximately $9 million in improvements and studies.

- 10 year plan – recommendations for building and equipment operation and maintenance including biosolids facility upgrade, rebuild primary clarifier #3, trickling filter media replacement, approximately $10 million in improvements.
- 20-year plan – develop a plan to increase the plant's capacity to handle changing needs - phased expansion of the plant, approximately $40 million for total expansion.

Jim McKenzie, 1412 Longhorn Drive, said he was confused about the projections for the 275 Lift Station. McKenzie discussed a letter that was written by city staff in May 2023 to a property owner regarding existing flows through that lift station, which stated *"Adding the discharge flow rate for the Soy Crush Plant of 50 GPM and Prime Stop flow of 10 GPM to the current daily flow of 274 GPM, the revised total is 334 GPM, and if we assume continued growth equal to the past five years growth of 82 GPM, that would revise the total to 416 GPM in year 2028. This remains well below the current Phase I upgrade of 1200 GMP capacity."* McKenzie noted this would only be 1/3 of capacity in 2028. McKenzie questioned where the projections in the master plan came from. The proposed 26% cost increase in sewer rates would amount to $25 million over the 20-year life of the bond. McKenzie questioned why we would want to put this in unless we have reasonably known demand, instead of charging customers without known demand and adding cost for something we don't know is needed.

Rames said letter reference by McKenzie was written to answer questions to citizens related to backups in a particular area. The projections in the letter were a result of looking at growth in the area, and projecting the same level of growth over the next five years. When we engage in master planning for sewer systems, there are specific numbers we use in that planning. Would have to be a decision made by city whether it was desirable to move forward with the Omaha Lift Station. No decision has been made by council to move forward with construction.

Rod Wilke, 2401 Hardison Drive, questioned water capacity storage at 25th St & Prospect Ave. It was noted that the current storage tank is a 750,000-gallon tank. Wilke said the proposed 1-million-gallon storage tank would be added in a prime residential area. Wilke also noted his sewer rate is double his water rate and that he contacted Kearny, Columbus, and Fremont, all of which had substantially lower sewer rates than Norfolk. Moving forward with the Omaha Lift Station project would put a significant burden on the public.

Dan Wilson, 1300 E Norfolk Ave, said had this project been done in 2016, it would have been $4 million less. Wilson said based on the numbers we don't need it, but people's houses keep getting flooded; events keep happening. Must have some sort of a plan.

Mayor Moenning asked about Economic Development – potential new housing and commercial and industrial development and how we make projections in terms of what is needed for infrastructure to accommodate potential development.

City Administrator Andy Colvin said the numbers we use come from the state. What we've been seeing lately is dairy. Dairy, will have high water usage for processing and high wastewater.

From an economic development standpoint, the better positioned we are for having something ready to go for an industry that we're trying to bring in, we position ourselves more competitively against other communities by having the necessary infrastructure and capacity. Comes down to – do you want to have it ready to go and be better positioned for new industry or wait and react to it when it comes?

Rames said the 25th Street & Prospect Avenue storage tank is a significant site within the city's water hydraulic system. There is a reason there's been a tower there for decades and a reason for the dirt tank. For as long as Norfolk exists, that will always be an extremely important site in terms of our ability to provide water pressure and peak water flows to the community. In the future, as we look at a new 1-million-gallon storage tank at this site, it would most likely be a dirt tank similar to what is there now. In terms of sewer backups, the Omaha lift station and the backups are two very different conversations. If/when the Omaha lift station happens, that will provide some additional relief to the backup issue, but the backup issue itself doesn't need $9 million to solve; there are gates that can be installed, and backup issues can be solved less expensively. Rames reiterated that the lift station and backup issues are different conversations and wants to make sure we aren't looking at those issues as one thing, they are different things.

There being no further business, the Mayor adjourned the meeting at 5:40 p.m.

_____
Josh Moenning
Mayor

ATTEST:

_____
Brianna Duerst
City Clerk

(S E A L)

WATER AND SEWER MASTER PLANNING

CITY OF NORFOLK, NEBRASKA

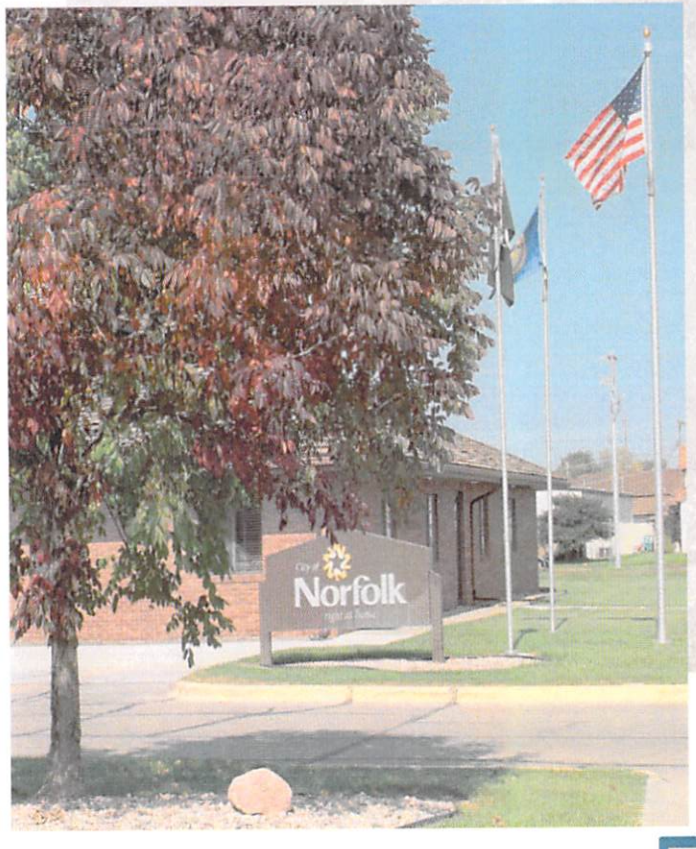
OCTOBER 2023

BUILDING A WORLD OF DIFFERENCE®

BLACK & VEATCH

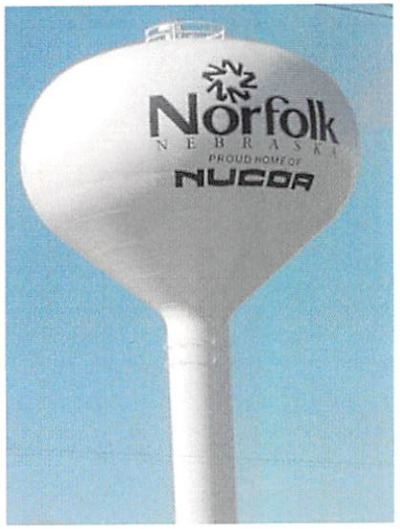
Agenda

- Planning Service Area & Population Projections
- Water System Planning & Capital Improvements
- Sewer System Planning & Capital Improvements



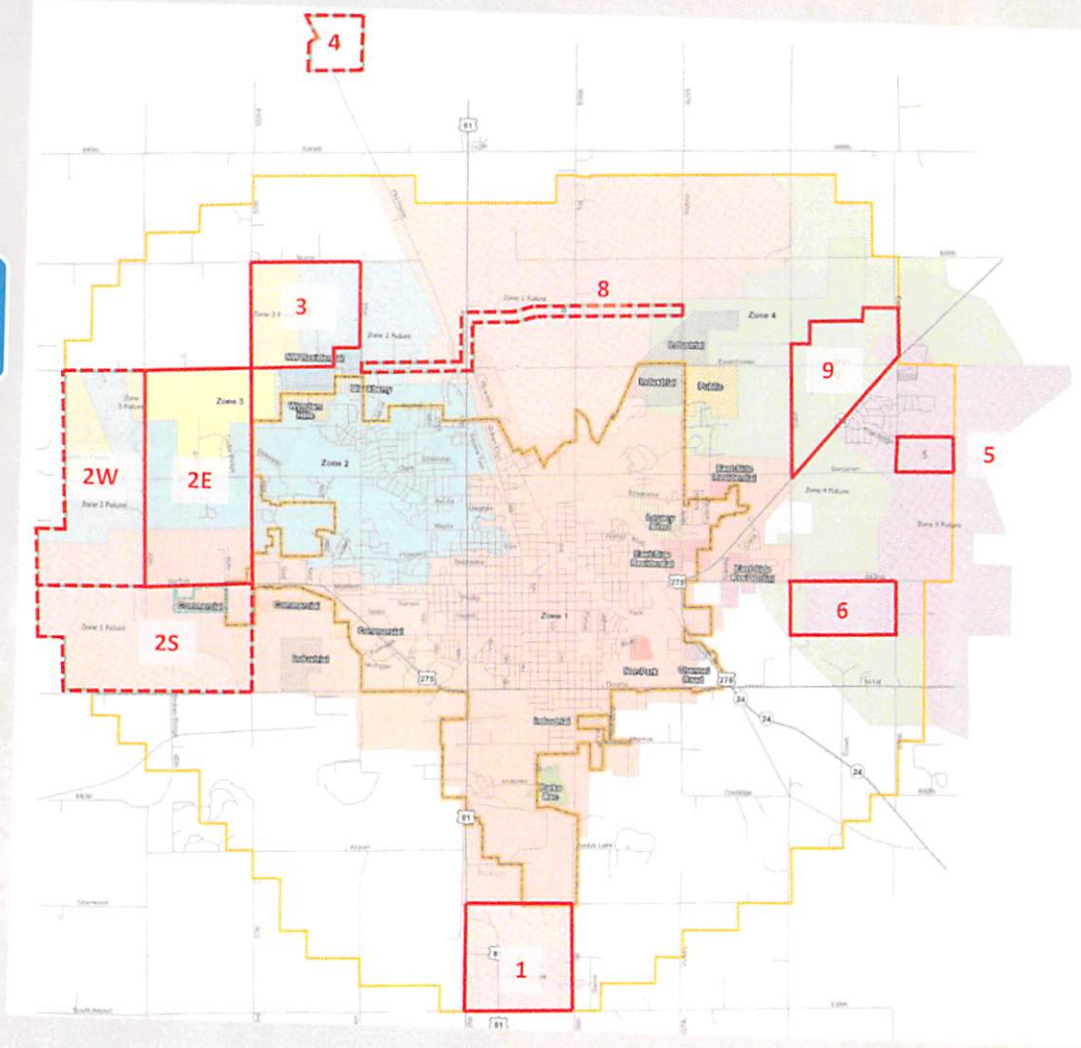
BLACK & VEATCH

Planning Service Area & Population Projections



Master Planning Service Area

- Growth Areas From 2017 Comprehensive Plan for development within or near City limits through 2040
- Development Areas Based on potential development interests



Water Master Plan Update 2020
City of Norfolk, Nebraska
Study Area
Figure 1-1

Existing City Limits
Extraterritorial Jurisdiction Area (ETJ)

Future Growth Areas

- Blackberry (Single Family Residential)
- Channel Rd (Multi-family Residential)
- Commercial/Public
- East Side Area (Single Family Resid)
- Industrial
- Legacy Bend (Single Family Residential)
- Northwest Area (Single Family Resid)
- Nor-Park (Multi-family Residential)
- Parks/Recreation
- Wyndam Hills (Single Family Resid)

Amendment 4 Development Areas & Numbers

- 2E Hydraulic Model Evaluation
- 2S Qualitative Evaluation

Distribution System Pressure Zones

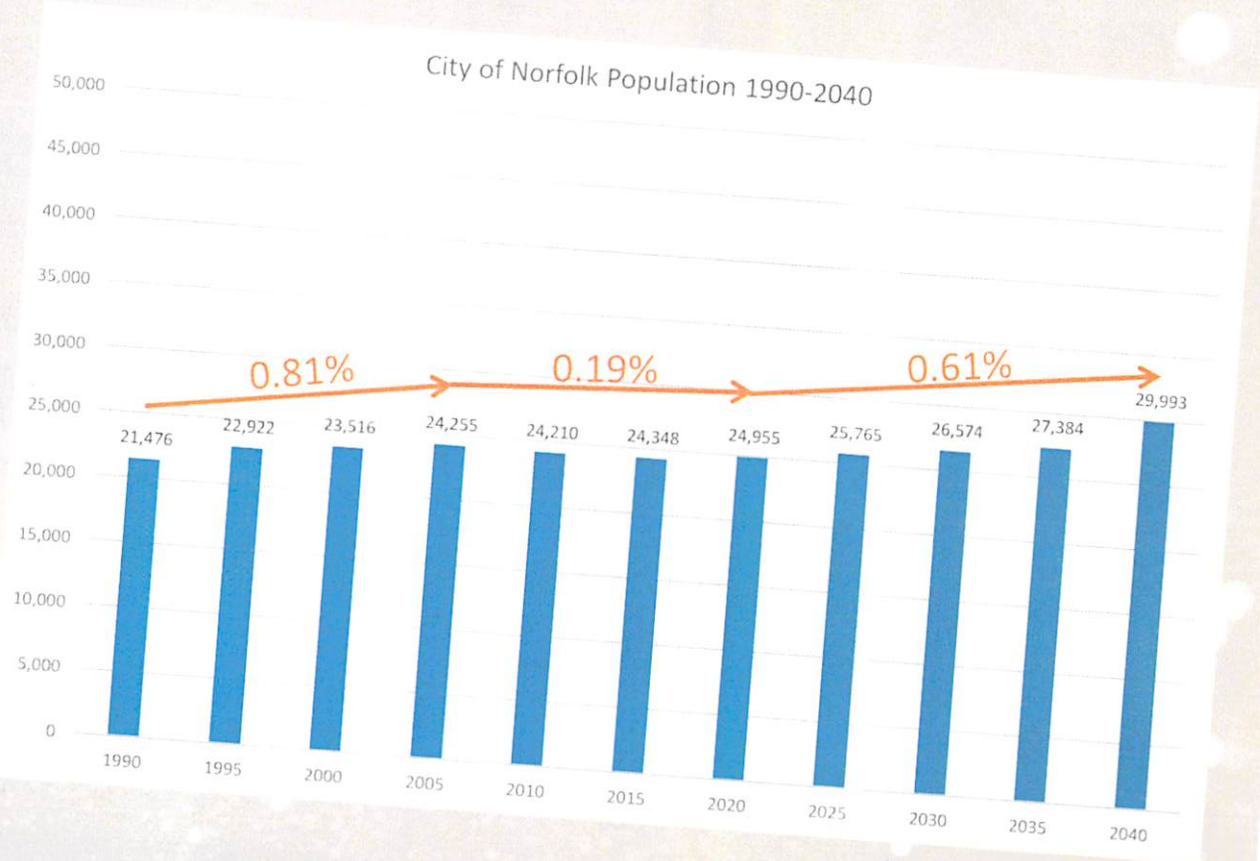
- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 1 (Future)
- Zone 2 (Future)
- Zone 3 (Future)
- Zone 4 (Future)
- Zone 5 (Future)

Norfolk
BLACK & VEATCH
Building a world of difference.

NORFOLK_INFOWATER_PRO.aprx; January 25, 2023

Growth Area Population Projections

- Data From 2017 City Comprehensive Plan Adds 3,200 People from 2020 to 2040
- 2040 Projection Also Includes 1800 People from Woodland Park
- 50-YR Aggregate Growth Rate of 0.55%



Water System Planning and Capital Improvements (March 2023)

Water System Data

Production and Treatment Facilities

- West Well Field – 9.6 mgd sustainable yield
- West Water Treatment Plant – 14.5 mgd
- East Well Field – 1.4 mgd sustainable yield
- East Water Treatment Plant – 1.4 mgd

Pressure Zone Elevations

- Zone 1 – 1493-1595 (HGL 1701)
- Zone 2 – 1581-1684 (HGL 1789)
- Zone 3 – 1680-1780 (Future)
- Zone 4 – 1581-1676 (HGL 1789)
- Zone 5 – 1627-1742 (Future)
- Eastern Heights Pumped Service Area

Pump Stations

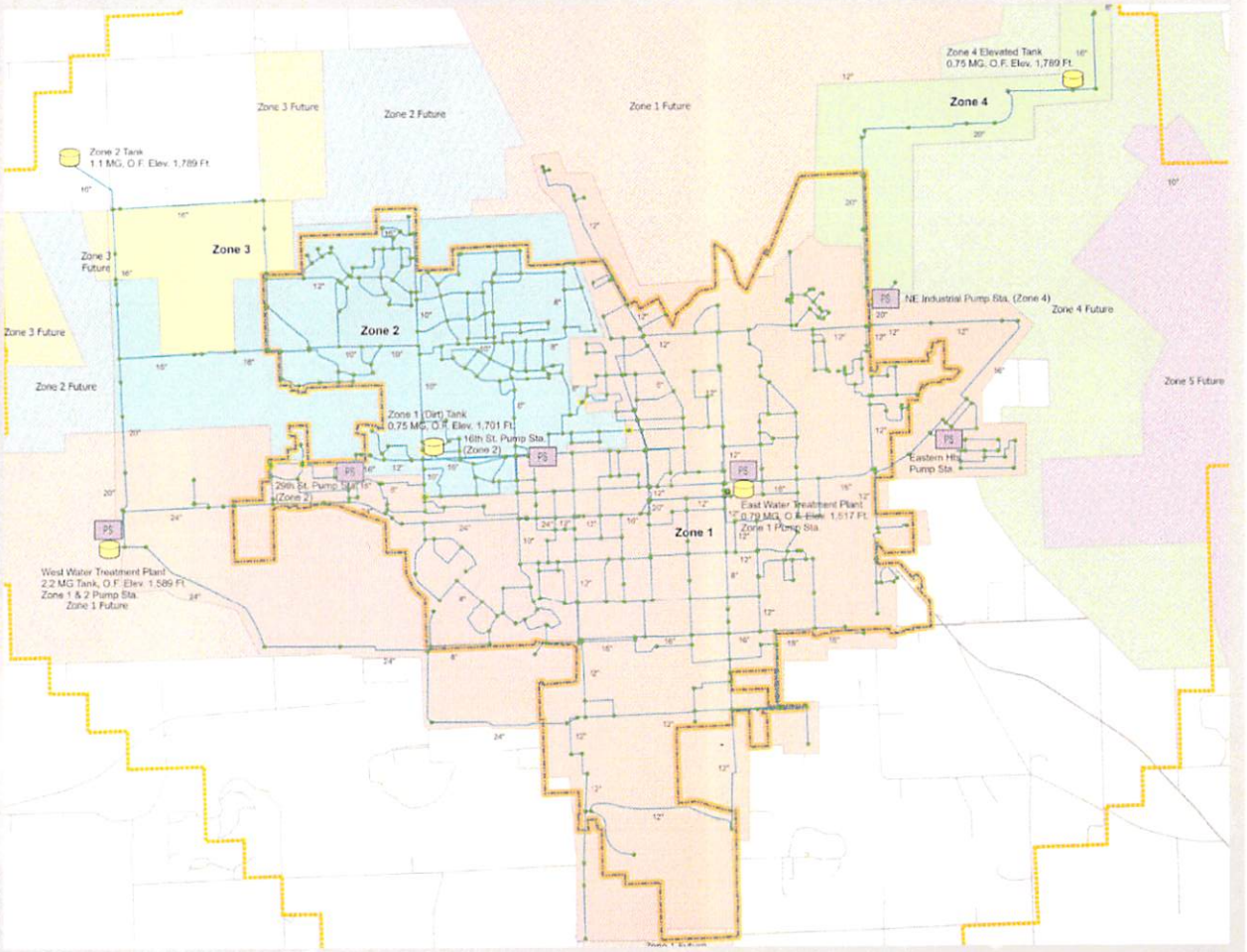
- 8 Pump Stations
- 0.7 – 13.7 mgd

Storage Reservoirs

- 5 Reservoirs
- 0.8 – 2.2 MG

Pipelines

- 181 Miles
- 4 – 24-inch pipe
- 87% of pipe 12-inch and smaller

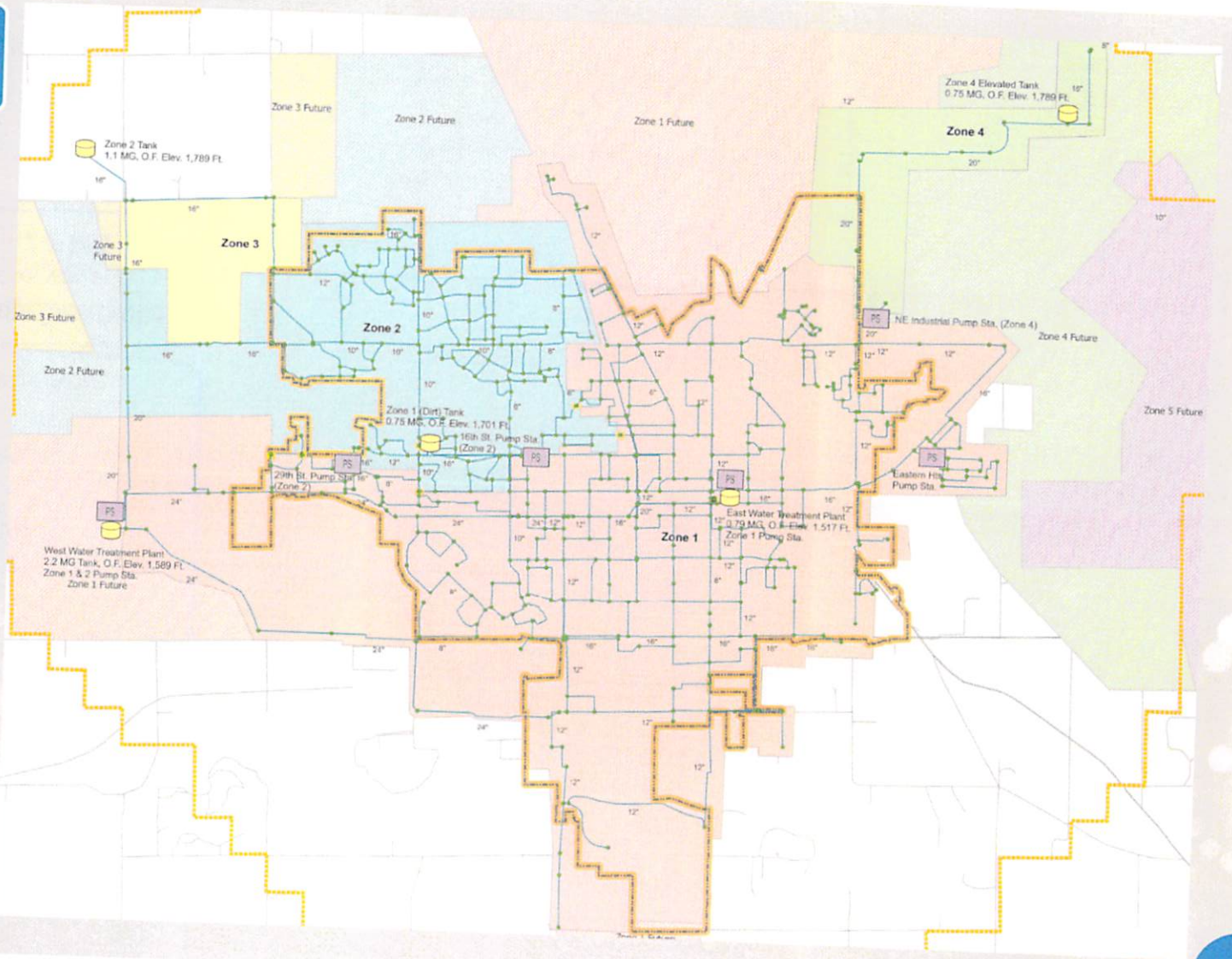


Hydraulic Model Update

- Updated pipe network
- 2019 metered sales data allocated to model nodes
- Max day diurnal demand patterns developed from SCADA operational data and applied to model
- Model calibrated to simulate actual system operation on July 27, 2021

Water System Evaluations

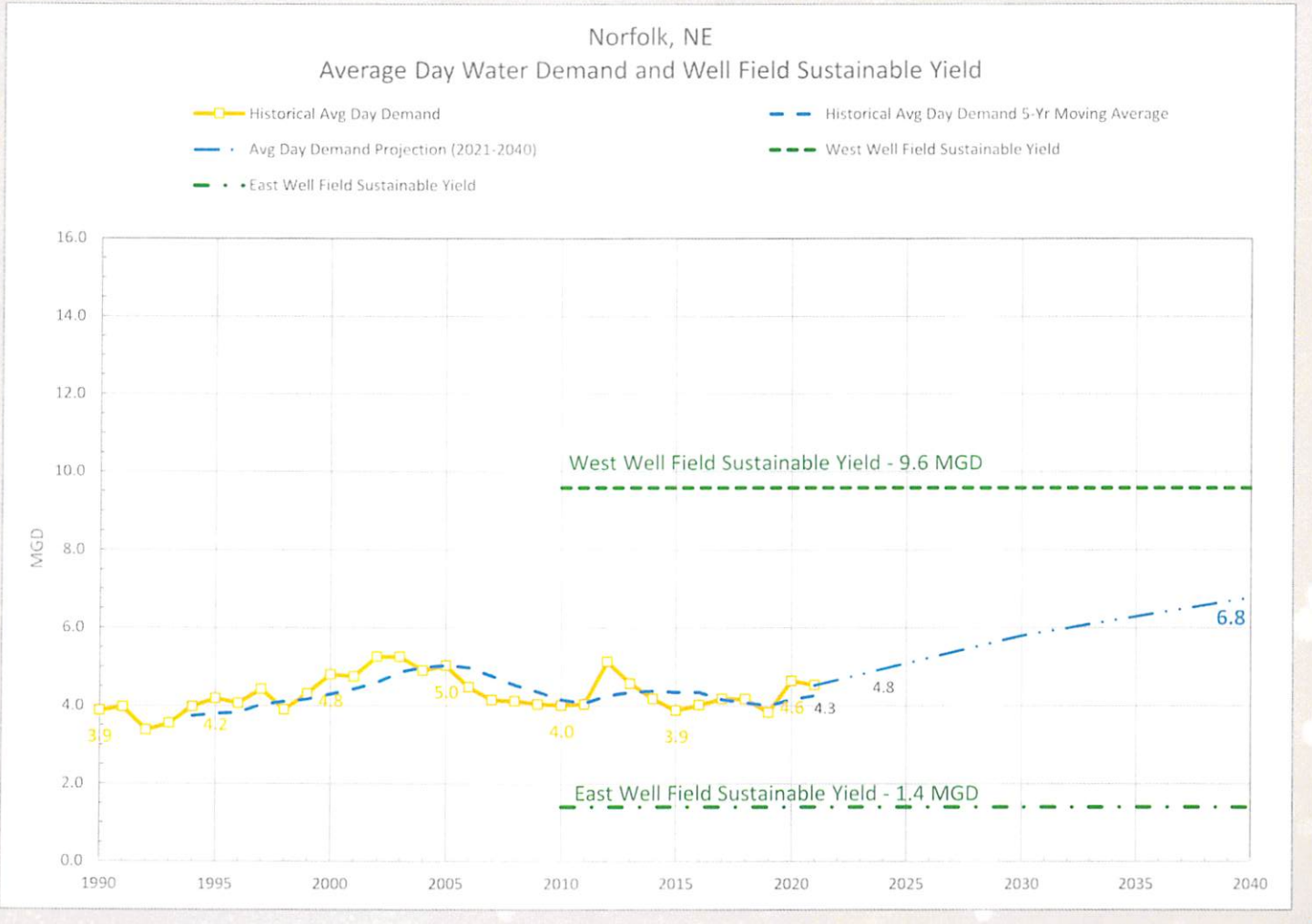
- Existing system performance
- Future system performance (2030-2040)
- Pipe velocity, high & low pressure, storage utilization, water age
- Develop and model necessary improvements



Water Demand Projections

Average Day Demand

- Total annual water use divided by 365 Days
- Used to define groundwater aquifer water supply requirements



Water Demand Projections

Maximum Day Demand

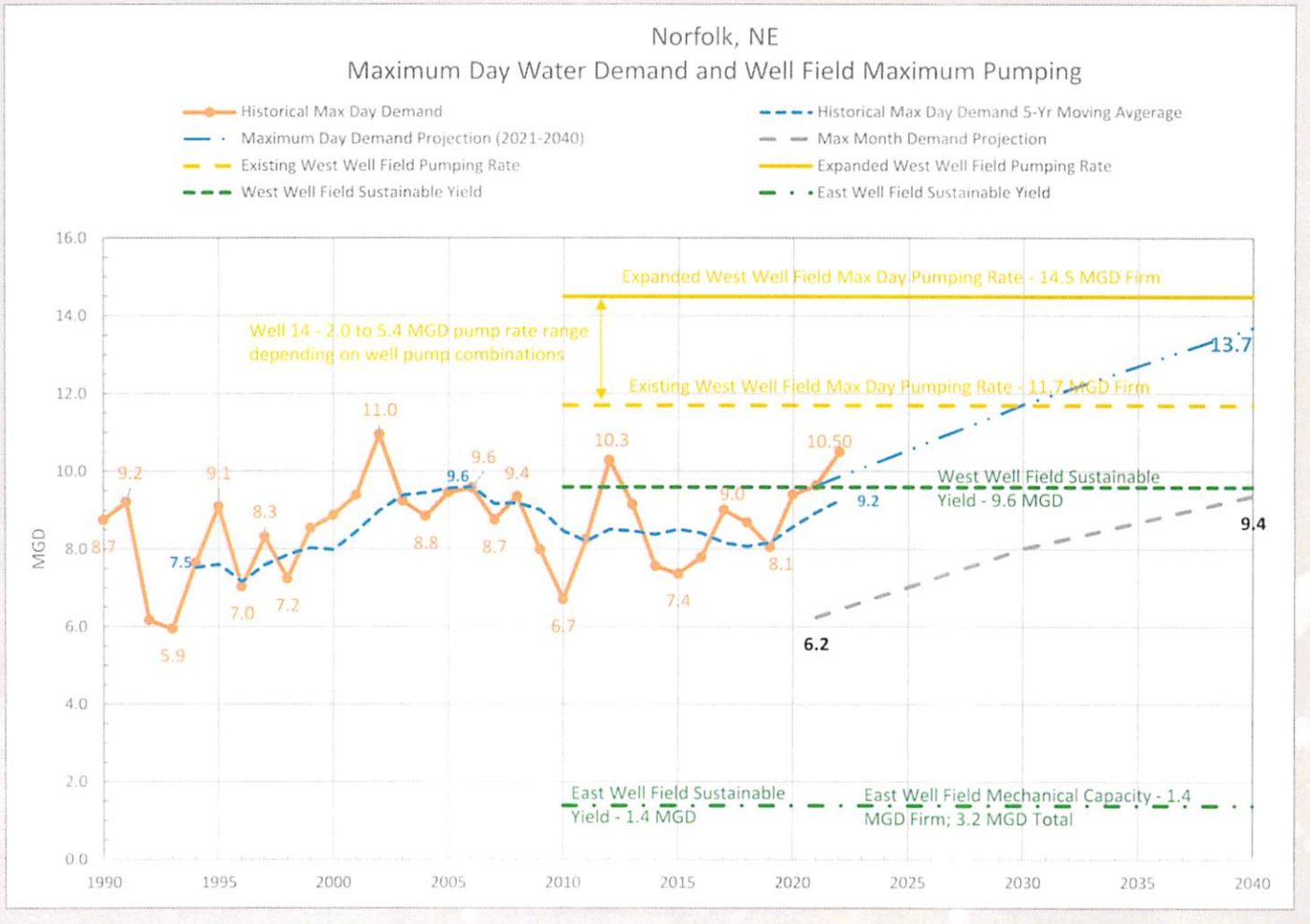
- Single highest demand day in the year
- Used to size treatment facilities, groundwater wells, and pump stations

2012

- One day over 10.0 mgd

2022

- Five days over 10.0 mgd

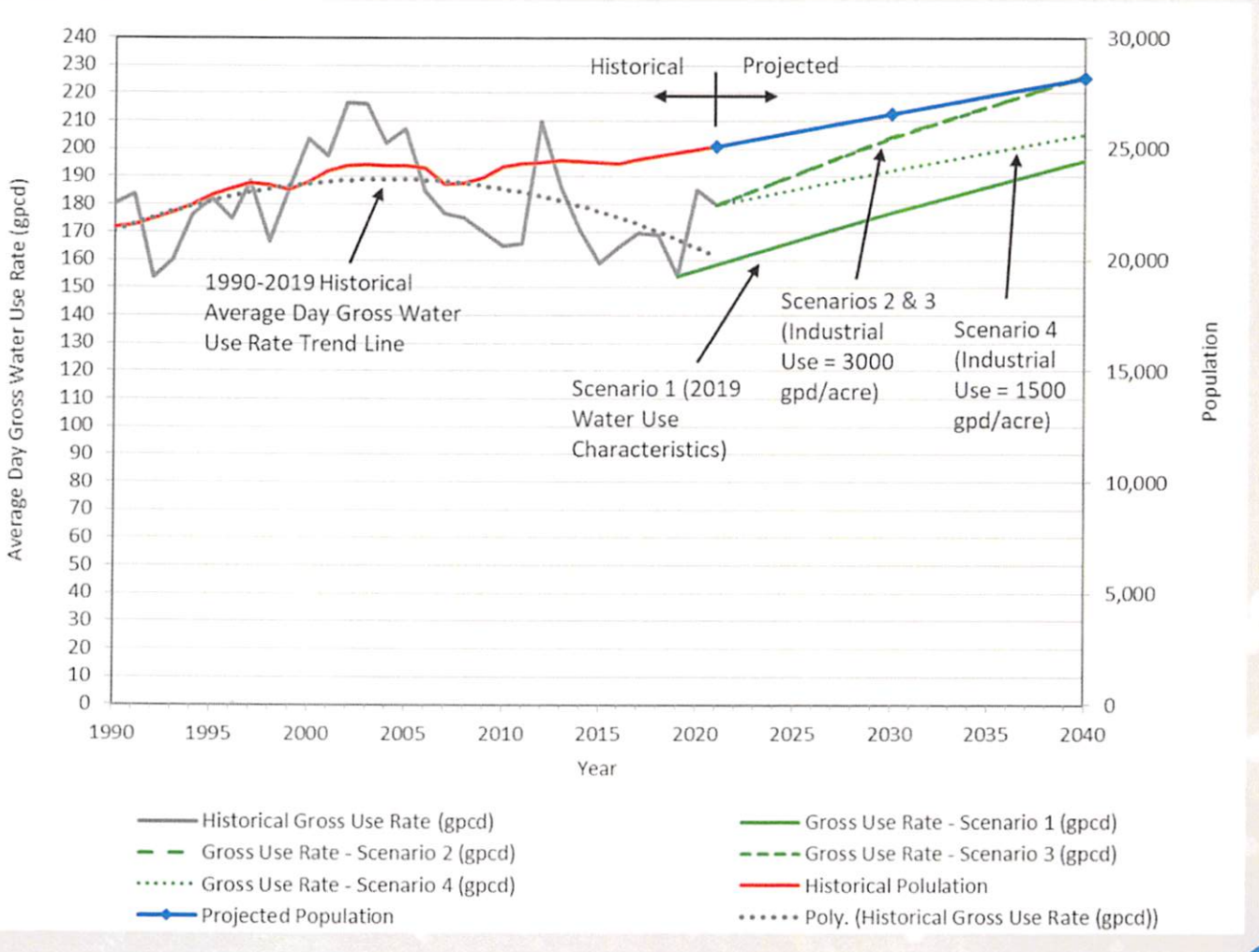


Per Capita Water Use Rates

- Historical Trend Peaked in 2000-05 (190-160 gpcd)
- Declines Due to Conservation and Low Flow Plumbing Fixture Code Requirements
- Increasing Trend in Projection the Result of "Conservation Floor" Plus Planned Industrial Demand of 3000 gpd/acre

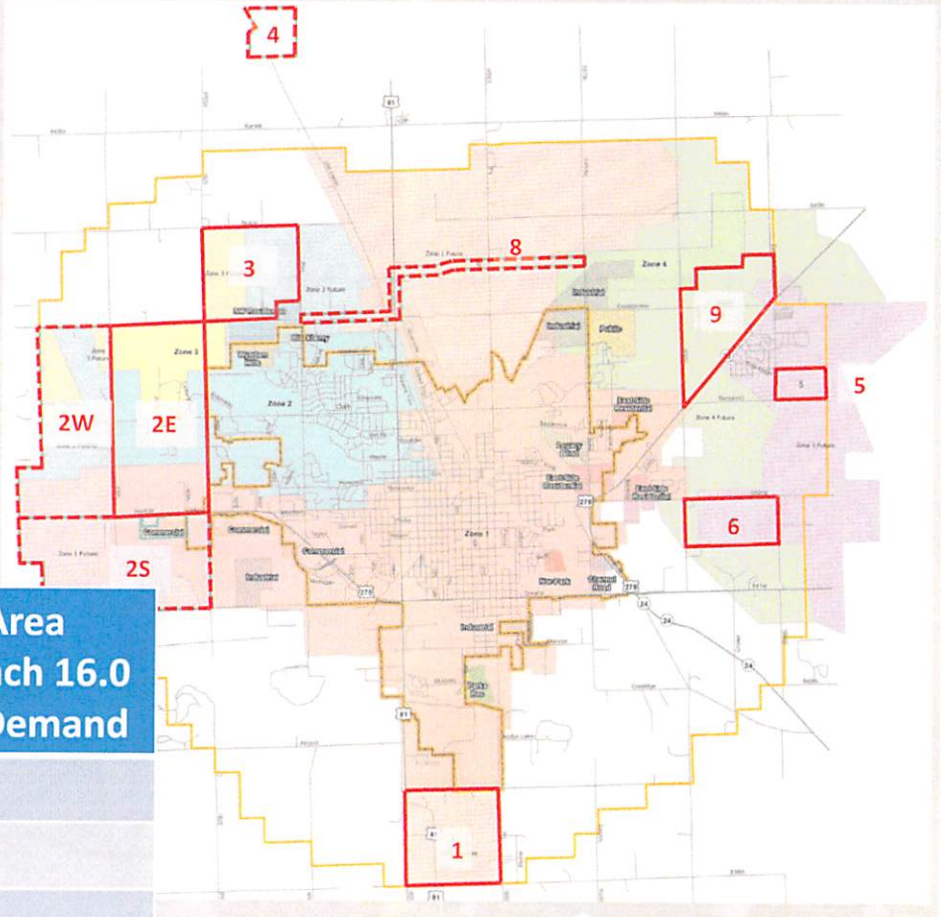
Peer City Per Capita Use Rates (gpcd)

- Rapid City, SD – 158-118
- Boulder, CO- 173-144
- Pueblo, CO – 249-196



Development Area Population Projections

- Water System: Capability to supply up to 16.0 mgd with recommended improvements
- 2.3 mgd additional demand beyond 2040 growth area projection

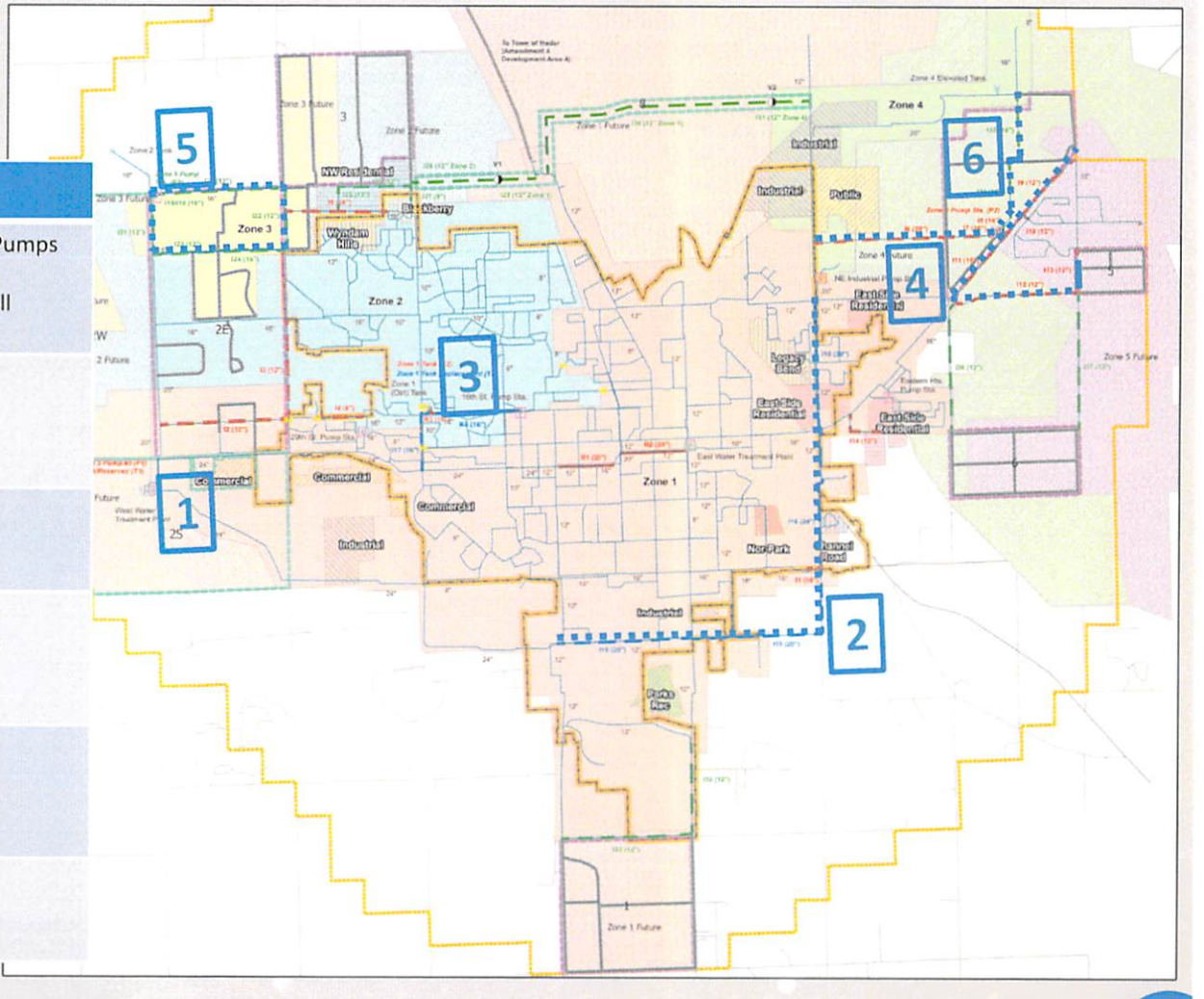


Development Area	Development Area Location	Percent of Area Buildout To Reach 16.0 mgd Max Day Demand
1, 2E, 3	West, North, South	71%
1, 5, 6, 9	South, East	100%
1, 2E, 3, 5, 6	East, West, North, South	61%

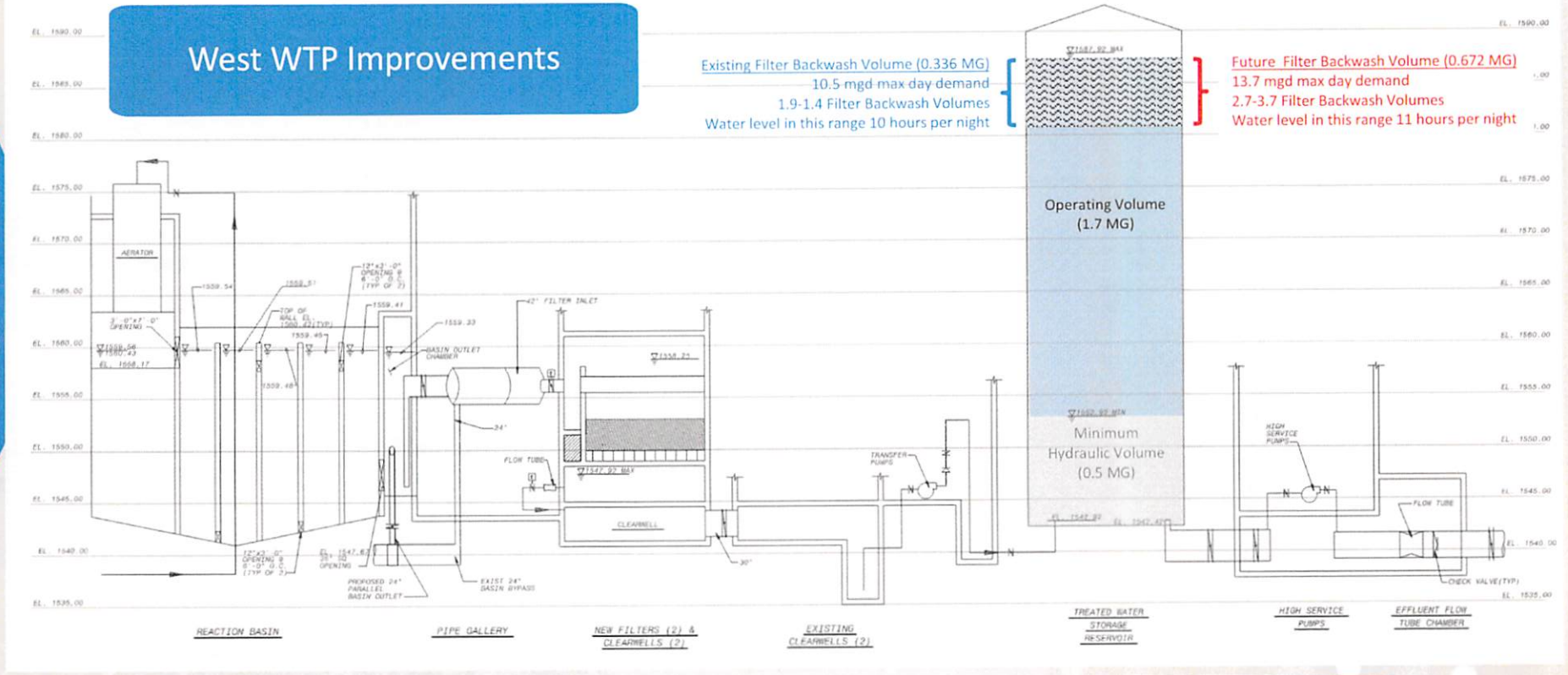
- Percent of Buildout Area Reached with 5,000 Additional Population and 3,000 gal/acre/day allowance for Industrial Development

Primary Water System Recommended Improvements

Name	Description	Facilities
1 – West WTP Improvements (2024-25)	Expands West WTP and West Well Field to 14.5 mgd. Improved filter backwash reliability.	Expanded Zone 1/2 Pumps 2.0 MG Tank Well 14 Collector Well $15.9M
2 – Zone 1 Transmission Main Expansion (Post-2031)	Provides improved water service access to SE area	20-inch pipe 4.6 miles $12.0M
3 – Zone 1 Storage Expansion (By 2030)	Provides necessary storage to meet peak hour demand	1.0 MG Tank 25th & Prospect $3.5M
4 – Zone 5 Service Expansion (Development Dependent)	Provides service to eastern development areas including Woodland Park	Zone 5 Pump Station 12-, 16-, 20-inch pipe 4.3 miles $11.0M
5 – Zone 3 Service Expansion (Development Dependent)	Provides service to NW development areas	Zone 3 Pump Station 12-16-inch pipe 4.0 miles $9.8M
6 – Zone 4 NE Loop (Development Dependent)	Provides looped service to NE industrial zoned area	16-inch pipe 1.2 miles $2.5M



West WTP Improvements



Transfer Pump Expansion

- Replace one existing pump with new 4,400 gpm pump
- Firm capacity of 14.5 mgd

Additional 2 MG Tank

- Additional filter backwash volume for operational flexibility
- Provides tank redundancy

Zone 1 & 2 Pump Expansion

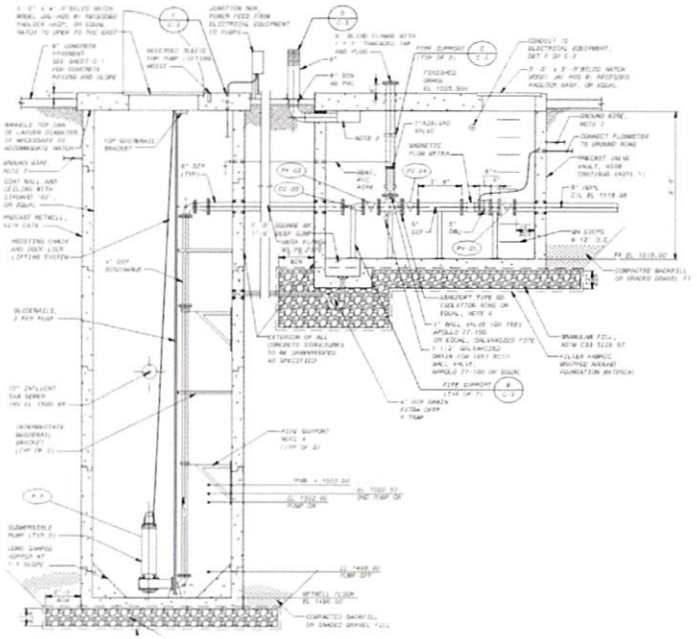
- Zone 1 - Replace one existing pump with new 6,000 gpm pump
- Zone 2 – Replace on existing pump with new 2,000 gpm pump
- Firm capacity meets zone demands

QUESTIONS AND DISCUSSION

BUILDING A WORLD OF DIFFERENCE®

BLACK & VEATCH

Sewer System Planning and Capital Improvements (March 2020)



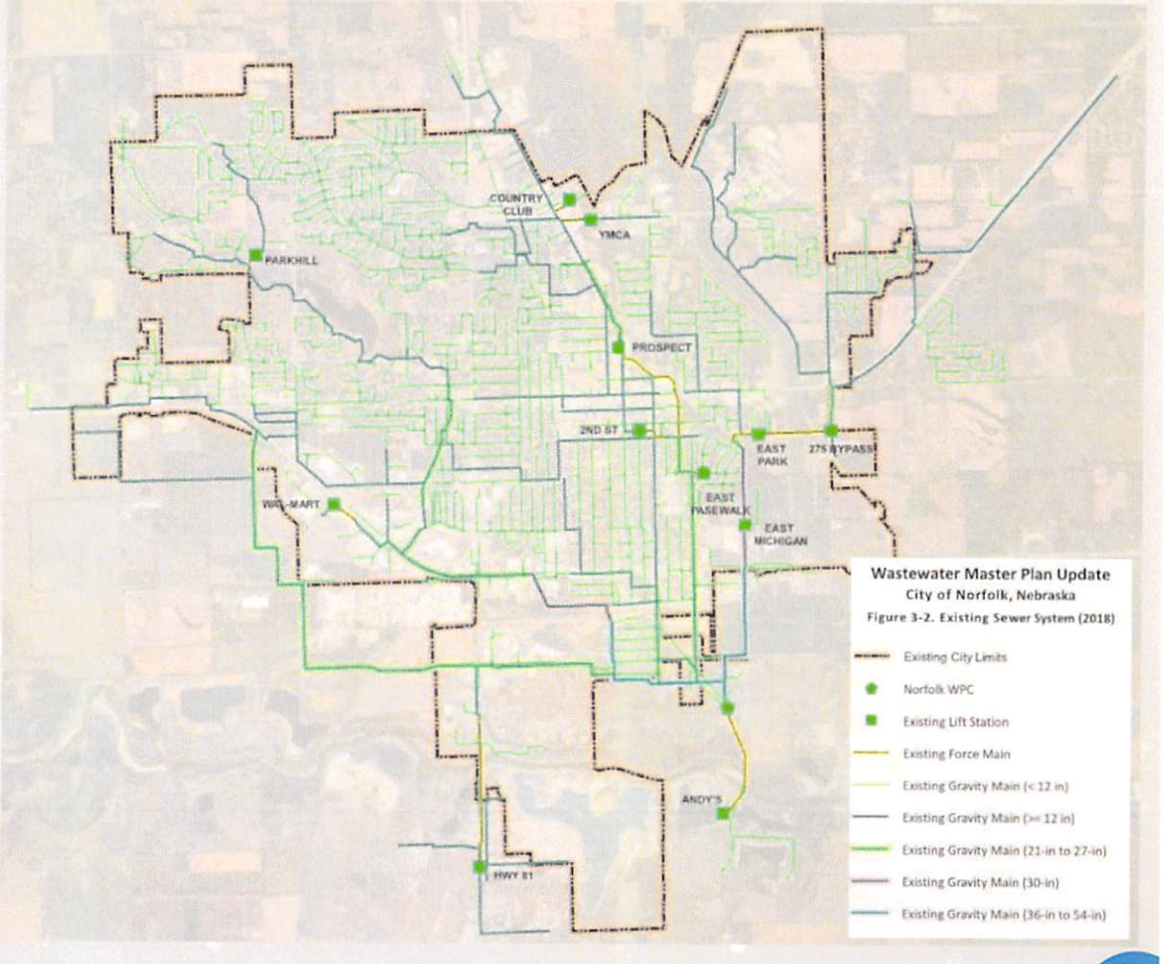
Sewer System Data

Gravity Sewers
- 138 miles
- 8-54-inch pipe
- 93% of pipe 18-inch and smaller
- 76% of pipe 10-inch and smaller

Lift Stations
- 12 Lift Stations
- 0.14 – 2.88 mgd capacity

Force Mains
- 3.4 miles
- 4-12 inch pipe

Water Pollution Control Plant
- Max Month – 7.1 mgd
- 4-hr Peak – 9.6 mgd
- Peak Hour – 14.9 mgd

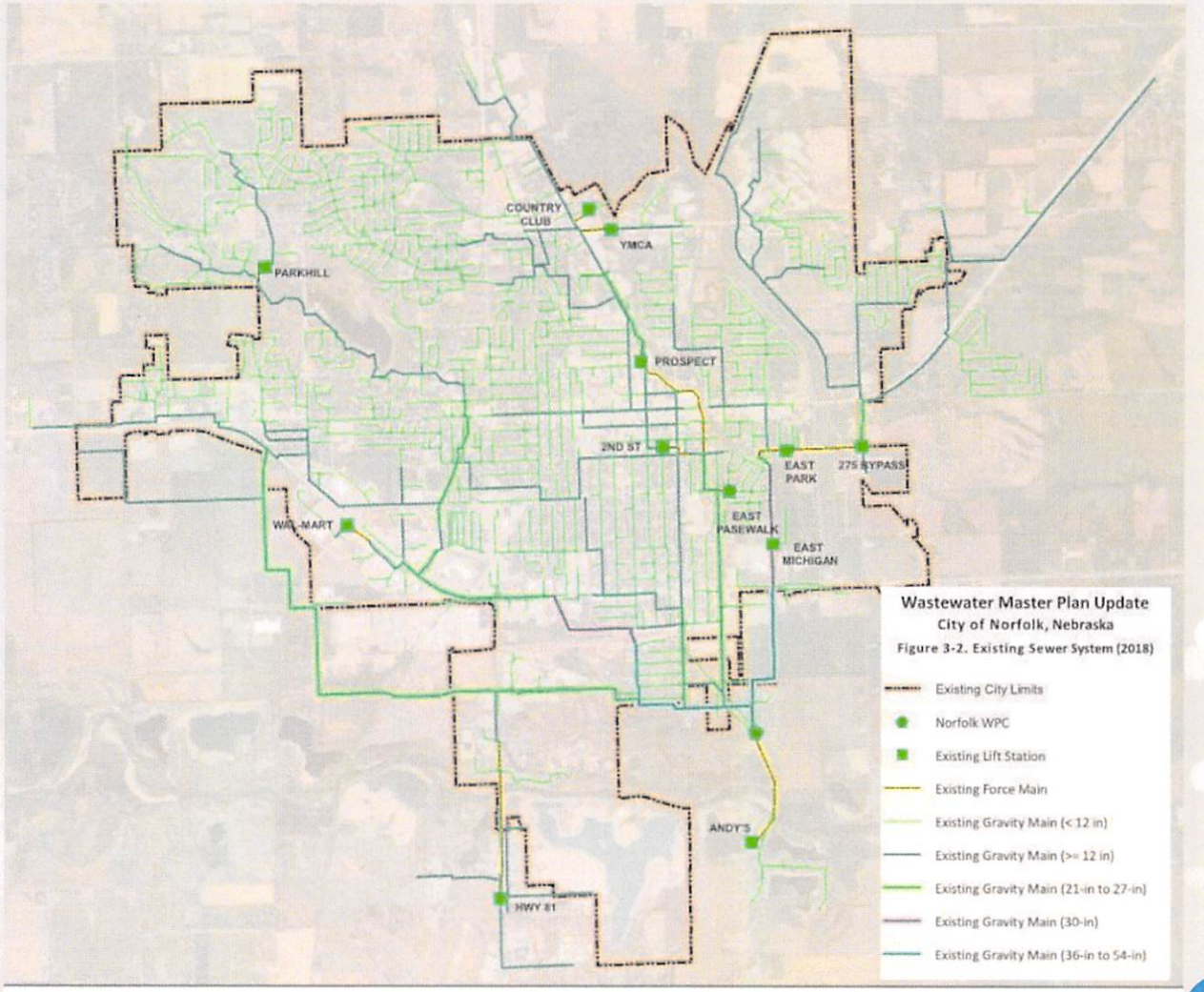


Sewer System Hydraulic Model Update

- Updated pipe network
- Base sewer flows developed from winter water metered sales data and allocated to manholes
- Diurnal flow patterns developed from WPC influent flow data and applied to model
- Model calibrated to simulate dry weather (Nov 15, 2017)and wet weather (June 20, 2018) flows

Sewer System Evaluations

- Existing system performance
- Future system performance (2040)
- Pipe velocity, % pipe utilization
- Develop and model necessary improvements



Sewer Flow Projections

- Historical downward trend from reduced I&I and reduced water consumption
- Per capita flows reduced from 148 to 124 gpcd
- Future 2040 flows distributed to 1100 acres of new development areas of various land use classes

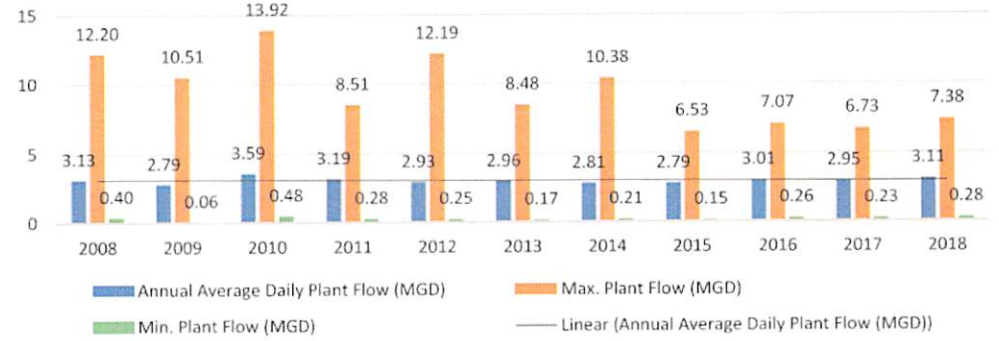


Figure 4-1 Historical Norfolk WPC Plant Flows (2008 -2018)

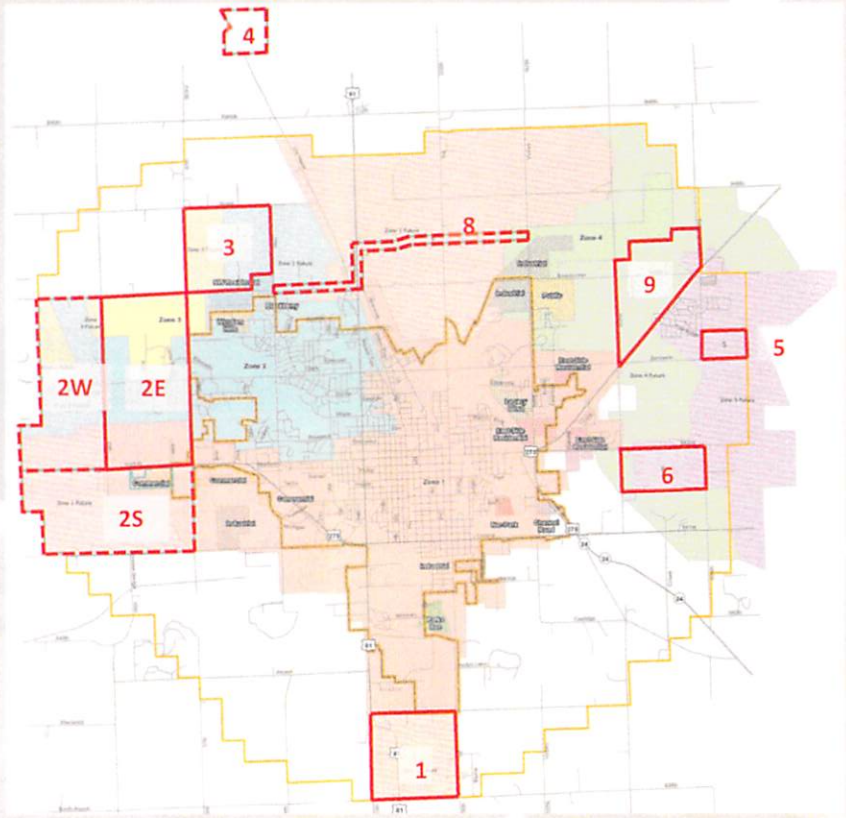
Table 4-4 Year 2040 Flow Contribution

LAND USE	2040 PLANNED DEVELOPMENT (ACRES)	FLOW (MGD)
Single-Family Residential	**393**	**0.17**
Blackberry	33	0.01
Wyndham Hills	44	0.02
Legacy Bend	92	0.04
Unnamed	224	0.10
Multi-Family Residential	**42**	**0.03**
Channel Road	19	0.01
Nor-Park	23	0.02
Commercial	**288**	**0.10**
Industrial	**377**	**0.10**
Total Growth Area	**1,100**	**0.40**

Development Area Population Projections

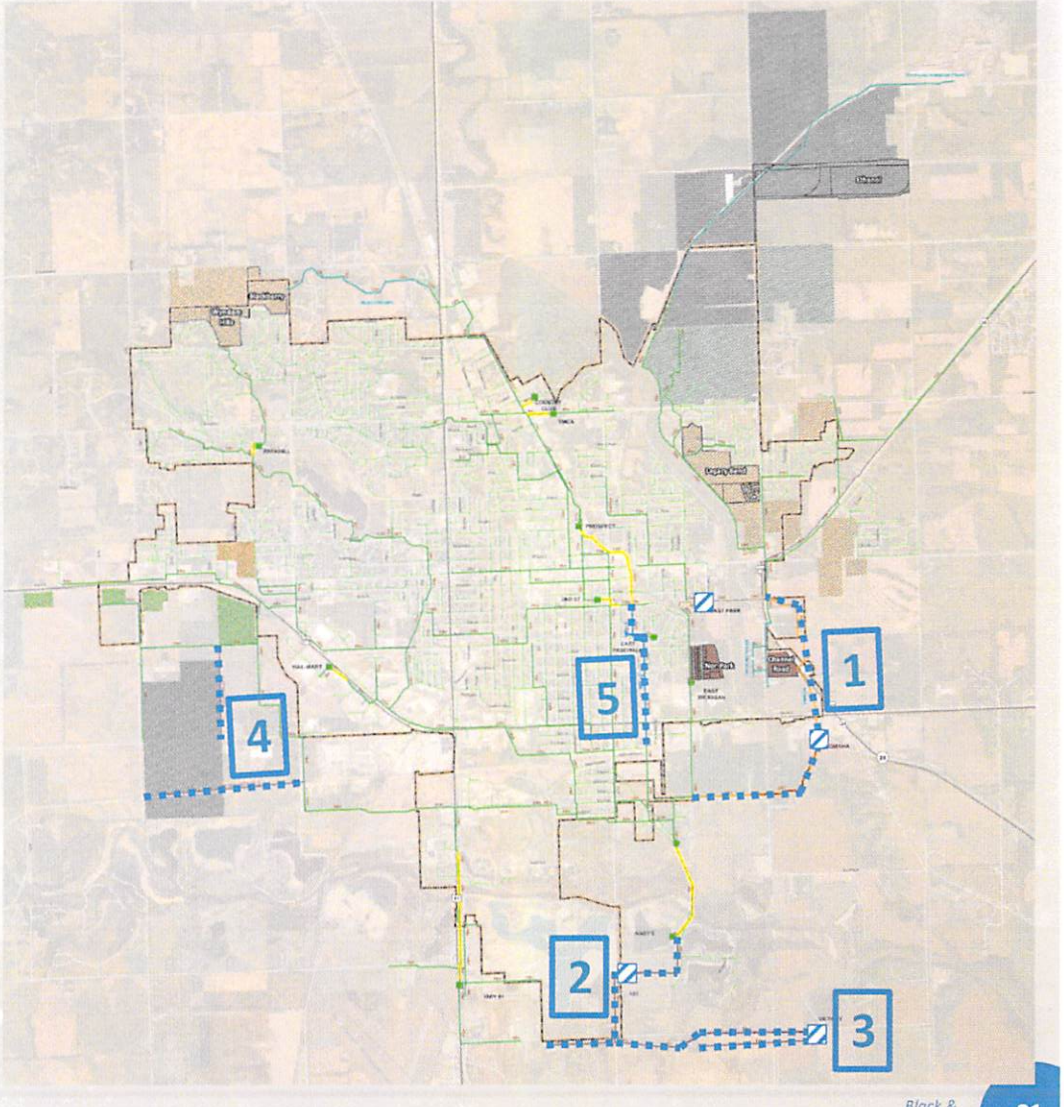
- Sewer System: Growth Capability To Convey Flow With Existing System and Planned Improvements

Development Area	Development Area Location	Percent of Area Buildout To Reach Sewer System Capacity	Population Growth of Area to Reach Sewer System Capacity
1	South	44%	1,348
2	West	20%	3,357
3	Northwest	55%	1,929
5	East	100%	549
6	East	100%	1,527
9	Northeast	50%	1,381



Primary Sewer System Recommended Improvements

Name	Description	Facilities
1 – Eastern Expansion	Accommodates growth in NE and SE service area. Abandon 275 Bypass Lift Station; Replace with new Omaha St. Lift Station, force main, and gravity sewer	Decommission 275 Lift Station (1,225 gpm) New Omaha St Lift Station (2,015 gpm) Gravity sewer: 24-30-inch; 1.5 miles Force main: 18-inch; 0.7 miles $9.7M
2 – Southern Expansion (Long-Term)	Accommodates growth in southern service area.	1st St Lift Station (175 gpm) Gravity sewer: 8-10-inch; 1.8 miles Force main: 6-inch; 0.2 miles $6.3M
3 – Southern Expansion (Long-Term)	Accommodates growth in southern service area	New Victory Rd Lift Station (90 gpm) Gravity sewer: 8-inch; 0.8 miles Force main: 6-inch; 0.8 miles $5.6M
4 – SW Expansion (Long-Term)	Accommodates growth in SW service area	Gravity sewer: 12-inch; 1.5 miles $2.0M
5 – Capacity Constraint	Pipe segments at 85% capacity utilization	Gravity sewer: 21-inch; 1.0 miles

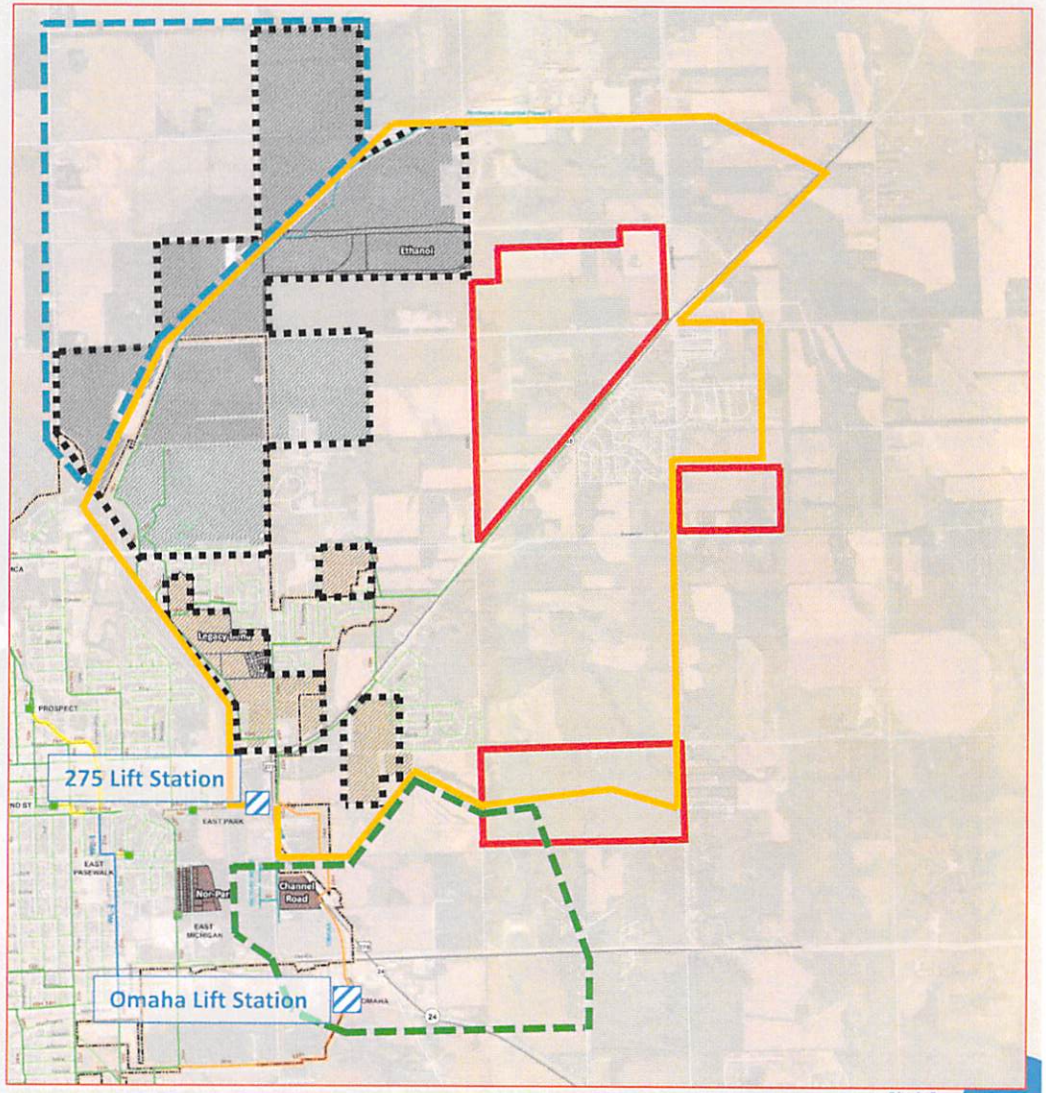


Eastern Expansion (Prepare for Growth)

- Projected growth exceeds 275 Lift Station Capacity
  - Development moratorium due to exceedance of 275 Lift Station capacity
  - Reduce I&I from Woodland Park
  - Expand 275 Lift Station to 1.76 mgd
- Decommission 275 Business Lift Station
- Replace with New Omaha Lift Station

Planning Source	Areas Included	Projected Peak Flow at 275 Lift Station
275 Lift Station Study (2015)	Projected Growth to Buildout	2.9 mgd (2040) 7.6 mgd (Buildout)
Sewer Master Plan Growth Areas (2019)	Infill to Match 2017 Comprehensive Plan	1.4 mgd (2040)
Sewer Master Plan Growth Plus Development Areas (2023)	Infill to Match 2017 Comprehensive Plan EJA Growth to Buildout	2.8 mgd (2040)
Omaha Lift Station Detailed Design (2022)	Area Added to Service Area Area Added to Service Area	2.8 mgd (Initial) 4.2 mgd (Expanded) TBD (Buildout)

Note: Existing 275 Business Lift Station Capacity is 1.76 mgd



QUESTIONS AND DISCUSSION

BUILDING A WORLD OF DIFFERENCE®

BLACK & VEATCH

Omaha Ave. Lift Station, Force Main, and Gravity Sewer Improvements

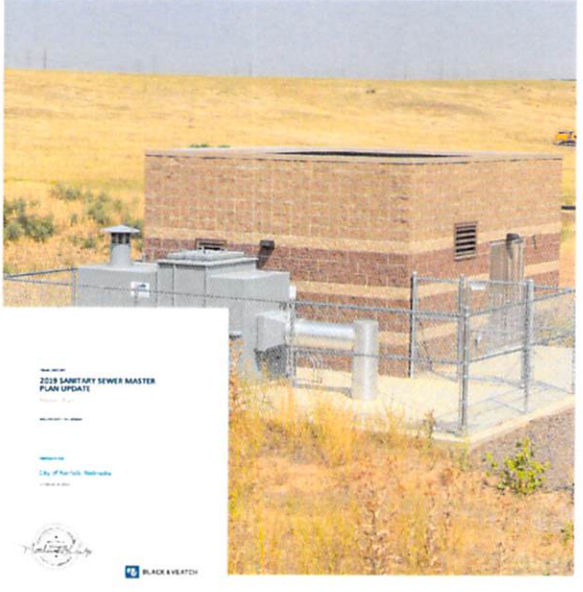
olsson

Picture courtesy of Google Maps

25

What Has Been Done So Far

- OCT plant
- Studies in 2015, 2017, and 2019
- Initial design completed in 2018
  - Includes abandoning bypass lift station 275
- Easements acquisition nearly complete
- Original OPC in 2016 — $5 Million
- Current CIP $9.1 Million



olsson

26

Omaha Ave. Lift Station Service Area

Wastewater Master Plan Update
City of Norfolk, Nebraska
Figure 5-7. Future System Deficiencies

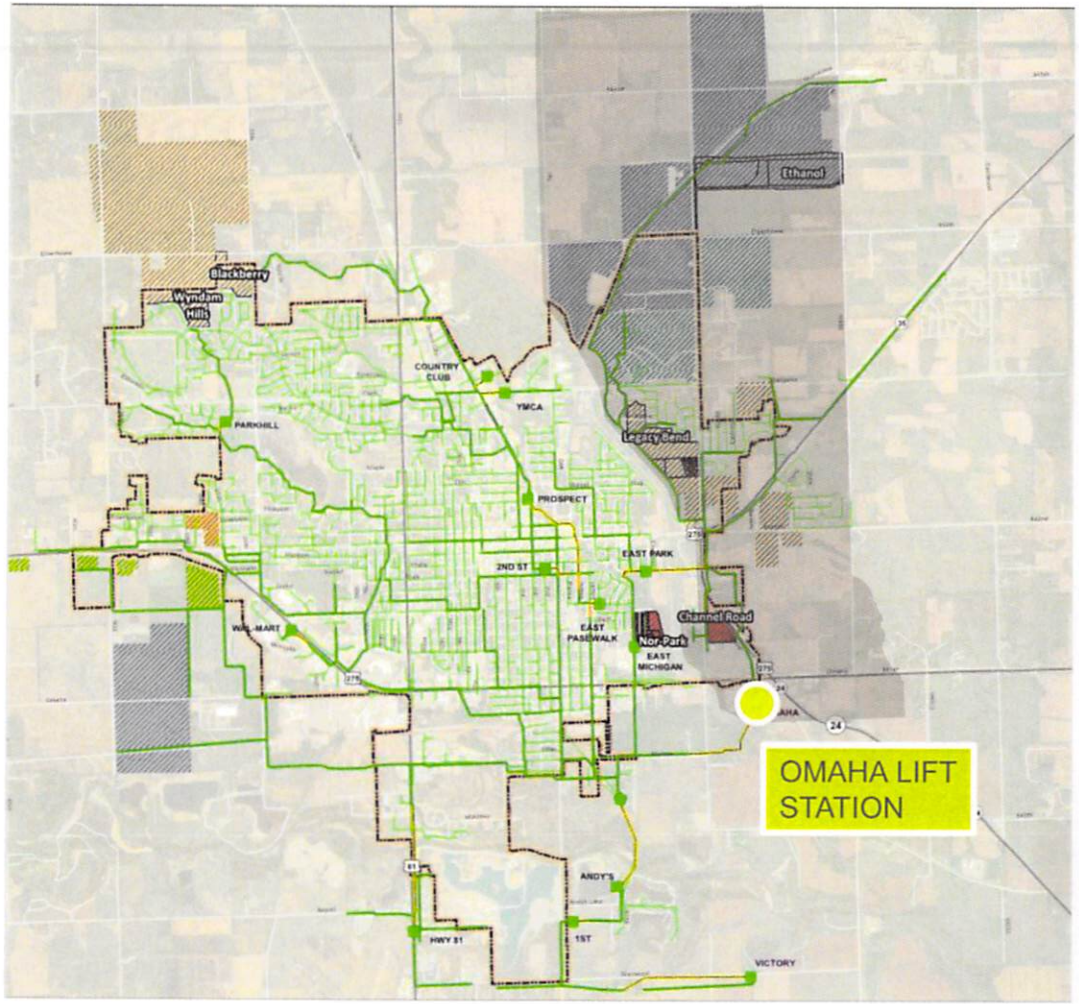
- Existing City Limits
- Lift Station
- Force Main
- Gravity Main (< 12 in)

Future Deficiencies (% Utilization)

- < 80%
- 80% - 125%

Future Growth Areas

- SF Residential
- MF Residential
- Commercial
- Public
- Office/Services
- Industrial



olsson

Weighing the Pros and Cons

PROS	CONS
• **Increased capacity** for future growth and peak flows • Omaha Ave. lift station service area is **shovel ready** • **Removes lift station** from NDOT ROW • Long term **cost savings** (lock in cost to control future inflation) • **Increase capacity** in North and West Norfolk • Back-up risk control systems	• Will be a **rate increase** for the project

olsson

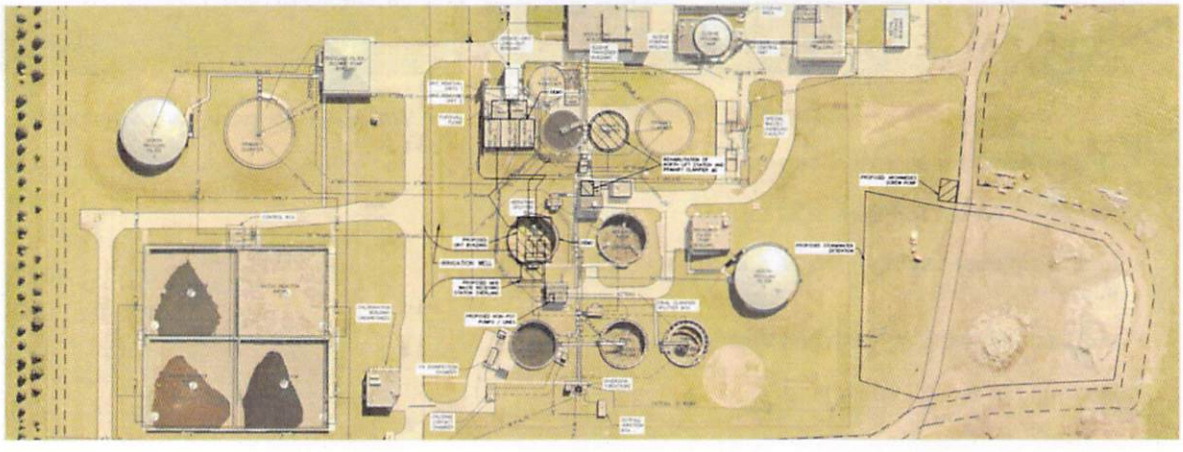
28

Questions?

olsson

29

Water Pollution Control Plant Master Plan



olsson

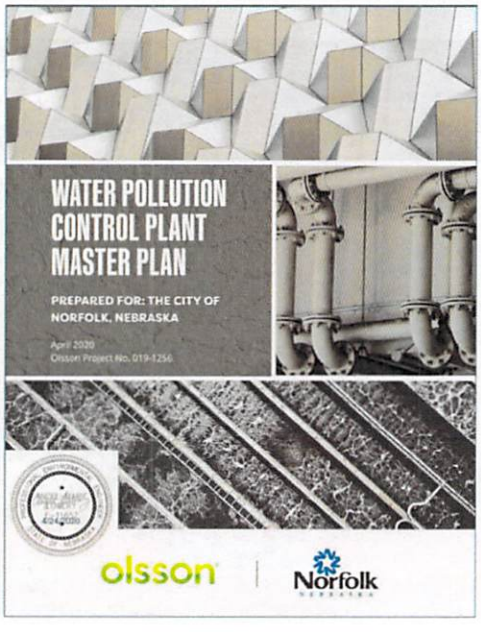
Picture courtesy of Google Maps

30

Expected Growth:

Planning For The Next 20

- ANALYSIS
- WATER REUSE EVALUATION
- FIVE-YEAR PLAN
- TEN-YEAR PLAN
- TWENTY-YEAR PLAN



olsson

31

Analysis & Inspection :

How we developed this plan

Population and Industrial Projections

Potential Future Regulatory Impacts

Projected Flows And Organic Loadings

Unit Process Analysis

Biowin Plant Modeling

Building and Equipment Operation & Maintenance (O&M)

olsson

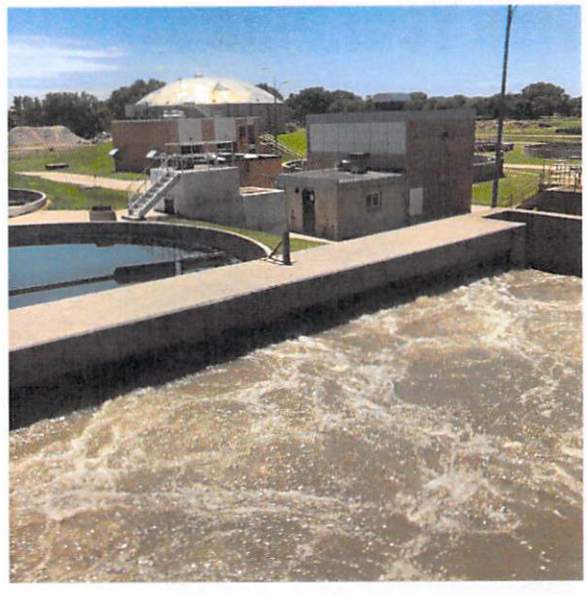
32

Water Reuse Evaluation

What are the City's Goals?

Onsite uses:
a. Irrigation
b. Cleaning at truck loading stations
c. Washing of process equipment

Industrial/Commercial Uses:
a. Further clean and pump to industries
b. Irrigation at parks or campuses



olsson

33

Here's the Story

Norfolk WPC Plant Master Plan

2020 Sanitary Sewer Master Plan Update

2018: City Invests in Master Plan Update

5 YEAR PLAN: Target 2025

- Grit process
- North Lift Station Rehab
- Nonpotable Water System
- Odor Control and Biosolids Studies

10 YEAR PLAN: Target 2030

- Capital Improvement Planning
- Project life of building and equipment

20 YEAR PLAN: Target 2040

- Plant Modeling
- Anticipate Needs
- Plan for Capacity

olsson

34

Five Year Plan

So, what are the first steps?

Plant improvements for **smooth plant operation**

- Necessary short-term improvements
- Optimize plant performance and capacity
- Approximately $9 million in necessary improvements and studies

- Grit process
- North Lift Station Rehab
- Nonpotable Water System
- Odor Control and Biosolids Studies

olsson

35

Ten-Year Plan

Okay, then what?

Recommendations for building and equipment **operation & maintenance**

- Capital Improvement Planning
- Projected life of buildings and equipment, some equipment dates back to the 1960's
- Approximately $10 million in necessary improvements

Biosolids Facility Upgrade

Rebuild primary clarifier #3

Trickling Filter Media Replacement

olsson

36

Reconditioning of inactive process tanks

a. Two different treatment processes

b. Aging infrastructure

olsson

37

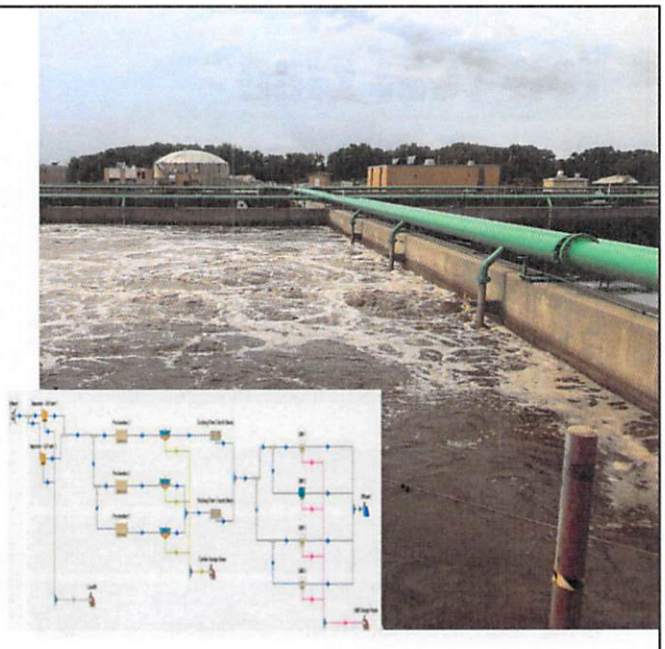
Twenty-Year Plan

A look into the future.

Develop a plan to increase the plant's capacity to handle changing needs

- Modeling of the plant
- Future regulatory limits, population growth, and new industries
- Approximately $40 million for total expansion (2020 dollars)

Phased Expansion of the Plant



olsson

38

Questions?

olsson

39