



IDEA2021

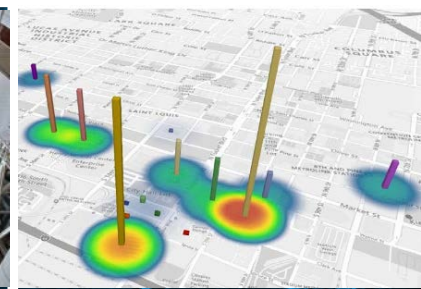
Powering the Future: District Energy/CHP/Microgrids
Sept. 27-29 | Austin Convention Center | Austin, Texas



Condition Assessment, Planning, and Continued Opportunity

Ashley Energy

September 29, 2021

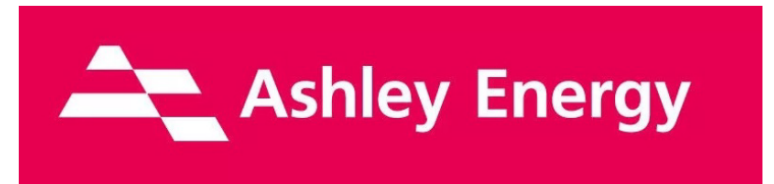


Agenda

- ▶ Background
- ▶ Water Event
- ▶ Refocus
- ▶ District Chilled Water Utility Planning Approach
- ▶ A Compelling Story
- ▶ Current Status
- ▶ Project Development



Ashley Energy Chilled Water Utility Master Plan



Carmody MacDonald P.C. & Ashley Energy LLC

**Ashley Energy Chilled Water Utility Master Plan
Project No. 120060**

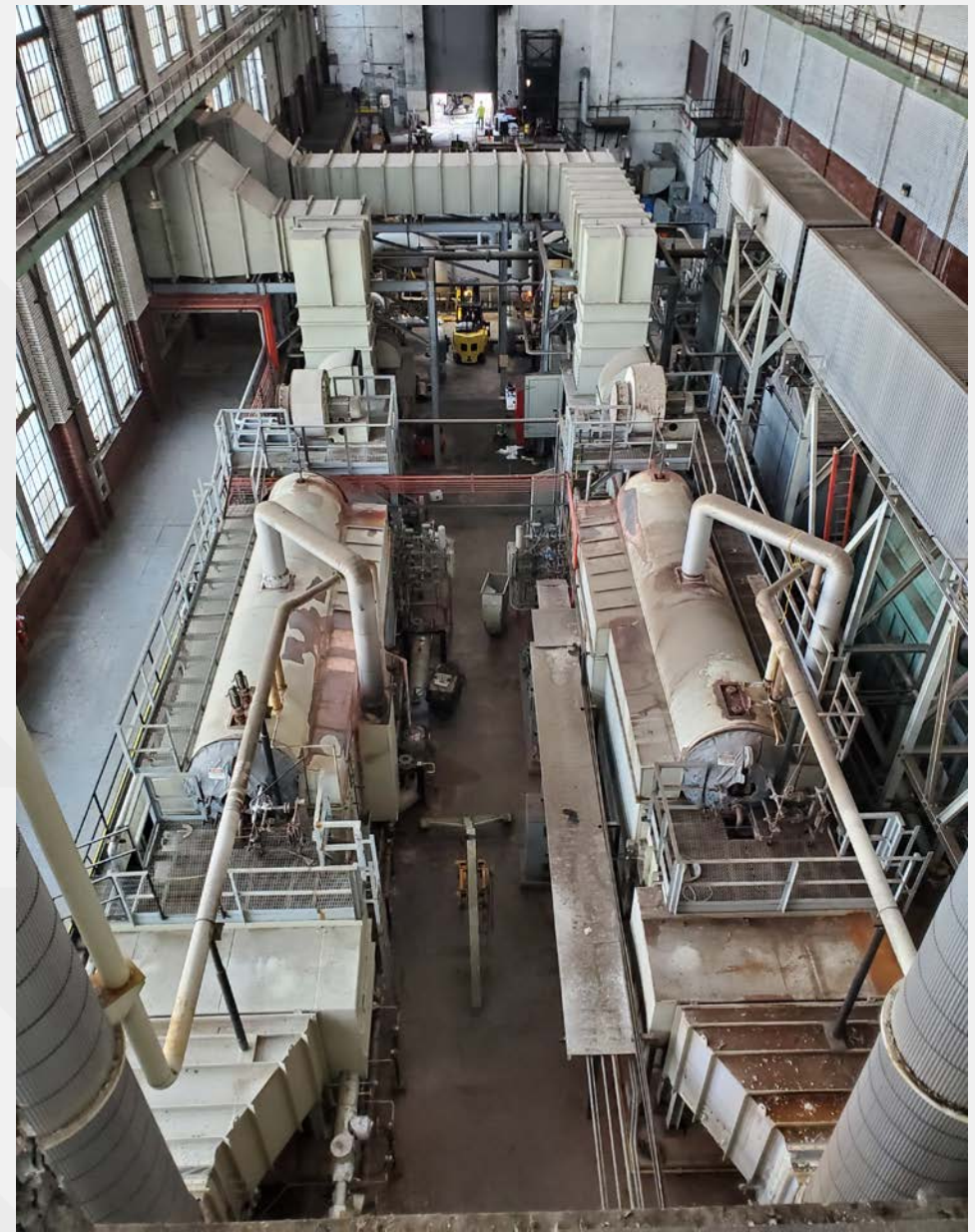
Ashley Energy Plant

► Location – St Louis, MO



Background

- ▶ 1902 – Original Plant Build
- ▶ 1970s – Fuel Conversion on Old Blr's 5 and 6
- ▶ 1998 – Cogen Units
- ▶ 2004 – Packaged Boilers
- ▶ Grade – Elev 40
- ▶ Lower Working Level of Plant – Elev 6



Water Event

- ▶ June 1, 2019 Sanitary and Stormwater Pumping Station failed
- ▶ > 6 million gallons of sanitary/stormwater entered the plant
- ▶ 11+ hour event, 25" of water per hour, filled plant to Elevation 29 (23+ feet)



Refocus

- ▶ Condition Assessment
- ▶ System Documentation
- ▶ Negotiations with Insurance Companies
- ▶ Restoring the Plant
- ▶ Looking to the future
 - Develop an Energy Park
 - Expanding reach of District Steam
 - District Chilled Water



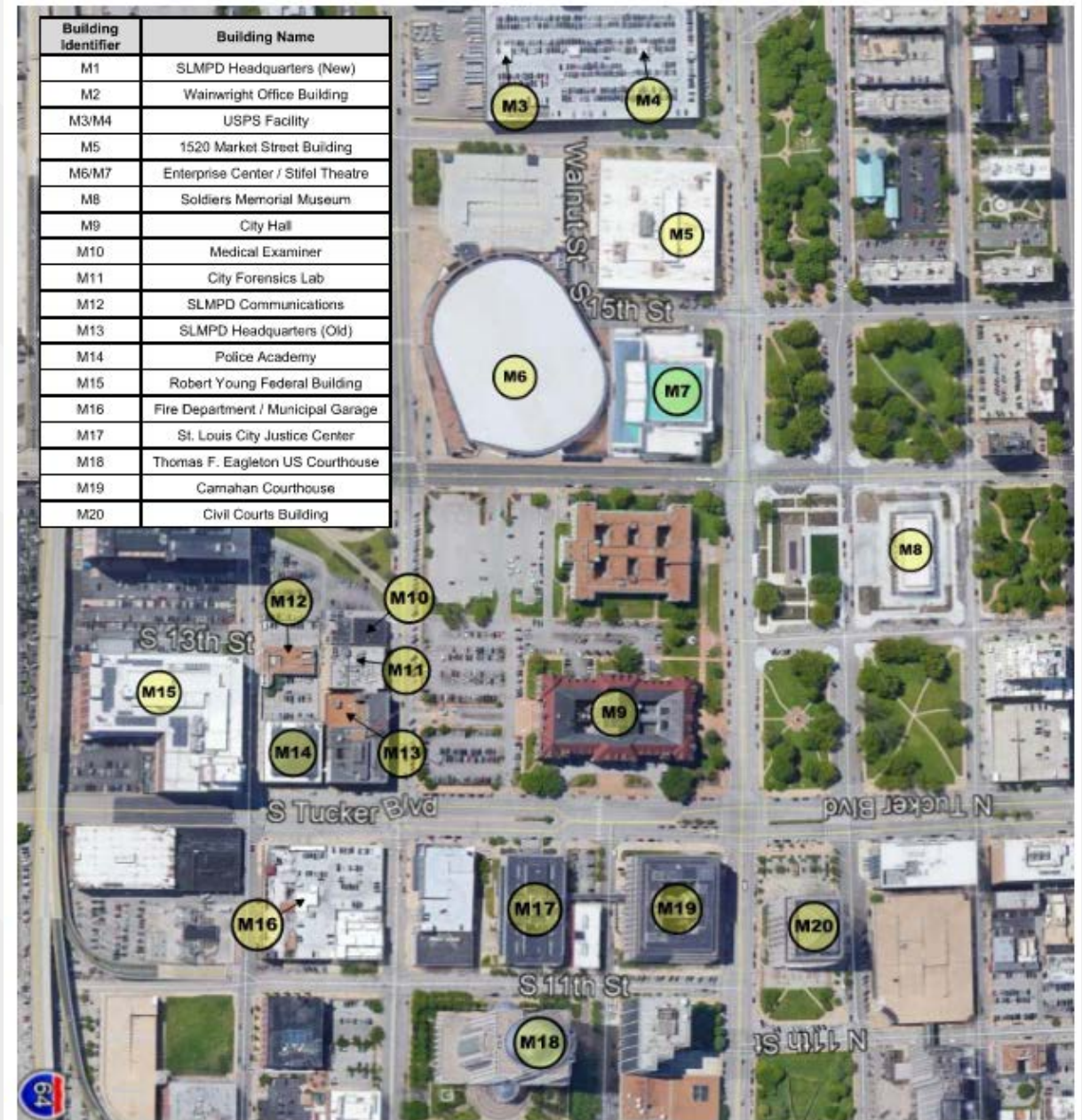
District Chilled Water Planning

- ▶ Future Potential Customer Bldg List Provided by Ashley
- ▶ Three Districts were investigated
 - Municipal
 - Convention Center
 - Ashley Energy Park
- ▶ Focus on “Municipal District”
- ▶ Power from Ashley Energy



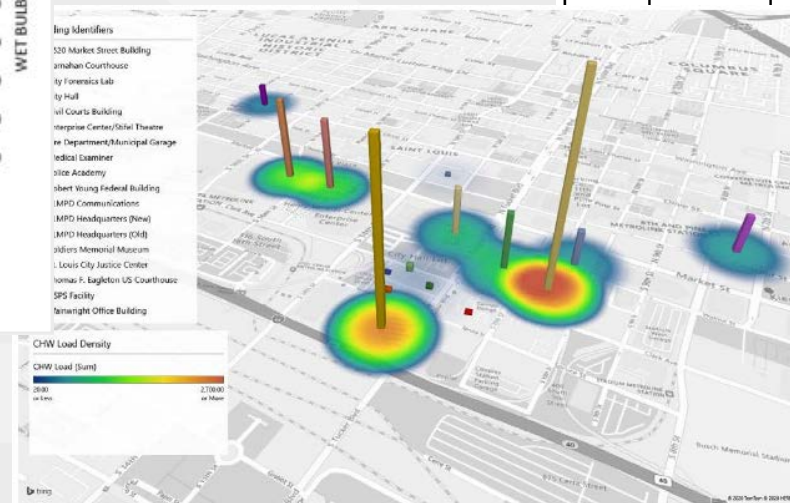
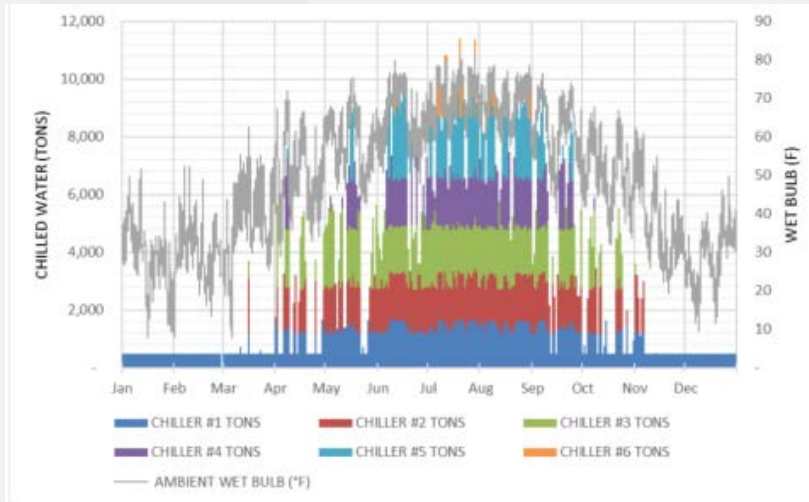
Municipal District

Building Identifier	Street Address	Building Name	Building Owner	Square Foot (sqft)	Occupancy Type	Site Visit (Y/N)
M1	1915 Olive St	SLMPD Headquarters (New)	City of St. Louis	143,000	Office	Y
M2	111 N. 7th St	Wainwright Office Building	Board of Public Buildings (State)	239,000	Office	N
M3/M4	1720 Market St / 1600 Market St	USPS Facility	United States of America	540,000	Postal Distribution Center	N
M5	1520 Market St	1520 Market Street Building	City of St. Louis	453,644	Office	Y
M6/M7	1401 Clark Ave / 1400 Market St	Enterprise Center / Stifel Theatre	City of St. Louis	653,000	Sports Arena/Theater	Y
M8	1317 Chestnut St	Soldiers Memorial Museum	City of St. Louis	38,000	Museum	Y
M9	1200 Market St	City Hall	City of St. Louis	314,894	Office	Y
M10	1300 Clark Ave	Medical Examiner	City of St. Louis	12,000	Morgue	Y
M11	1250 Clark Ave	City Forensics Lab	City of St. Louis	40,000	Laboratory	Y
M12	1225 Spruce St	SLMPD Communications	City of St. Louis	25,000	Office	Y
M13	1200 Clark Ave	SLMPD Headquarters (Old)	City of St. Louis	167,550	Office (Abandoned)	Y
M14	315 S Tucker	Police Academy	City of St. Louis	50,000	Office	Y
M15	401 S. Tucker Blvd	Robert Young Federal Building	United States of America	1,050,000	Large Office	N
M16	314 S. Tucker Blvd / 1122 Clark Ave	Fire Department / Municipal Garage	City of St. Louis	151,746	Fire Dept	Y
M17	200 S. Tucker Blvd	St. Louis City Justice Center	City of St. Louis	259,539	Prison Facility	Y
M18	111 S. 10th St	Thomas F. Eagleton US Courthouse	United States of America	1,200,000	Office/Courthouse	N
M19	1114 Market St	Carnahan Courthouse	City of St. Louis	546,106	Office/Courthouse	Y
M20	10 N. Tucker Blvd	Civil Courts Building	City of St. Louis	290,761	Office/Courthouse	Y



Loads Approximated

- ▶ Building visits, operator discussions
- ▶ For buildings not visited, ASHRAE load factors applied based on space type



Building Identifier	Building Name	Chiller	Chiller Model Number	Capacity (tons)	Year Installed	Equip. Age	Notes/Comments
M1	SLMPD Headquarters (New)	Trane	CVHE500	411	2000	20	Building includes a 20-30 ton free cooling (Approximated)
		Trane	CVHE500	411	2000	20	
M5	1520 Market Street Building	McQuay	NA	600	1986	34	One of these original 1986 chillers was converted to R-134A
		McQuay	NA	600	1986	34	
		McQuay	NA	600	1994	26	
M6 / M7	Enterprise Center / Stifel Theatre	Trane	NA	1000	2019	1	1,200 ton chillers are to be replaced with 1,000 ton units by September 2020
		Trane	NA	1200	N/A	N/A	
		Trane	NA	1200	N/A	N/A	
M9	City Hall	Daikin	WMC	200	2019	1	New Daikin chillers are magnetic bearing
		Daikin	WMC	200	2019	1	
M11	City Forensics Lab	Trane					
		Trane					
		Trane					
M17	St. Louis City Justice Center	York					
		York					
		York					
M19	Carnahan Courthouse	York					
		York					
		York					

Building Identifier	Building Name	Square Foot (sqft)	Chilled Water Peak Demand (tons)	Calculated Cooling Energy Density (sqft/ton)
M1	SLMPD Headquarters (New)	143,000	411	348
M2	Wainwright Office Building	239,000	598	400 ⁽¹⁾
M3/M4	USPS Facility	540,000	1,350	400 ⁽¹⁾
M5	1520 Market Street Building	453,644	1,200	378
M6/M7	Enterprise Center / Stifel Theatre	NOT CONNECTED ⁽³⁾		
M8	Soldiers Memorial Museum	38,000	60	633
M9	City Hall	314,894	800	394
M10	Medical Examiner	12,000	12	1,000
M11	City Forensics Lab	40,000	100	400 ⁽¹⁾
M12	SLMPD Communications	25,000	40	625
M13	SLMPD Headquarters (Old)	BUILDING ABANDONED		
M14	Police Academy	50,000	65	769
M15	Robert Young Federal Building	1,050,000	2,625	400 ⁽¹⁾
M16	Fire Department / Municipal Garage	151,746	15	10,116
M17	St. Louis City Justice Center	259,539	930	279
M18	Thomas F. Eagleton US Courthouse	1,200,000	3,000	400 ⁽¹⁾
M19	Carnahan Courthouse	546,106	550	993
M20	Civil Courts Building	290,761	875	332
Total		5,353,690	12,631	424 ⁽²⁾

Phasing

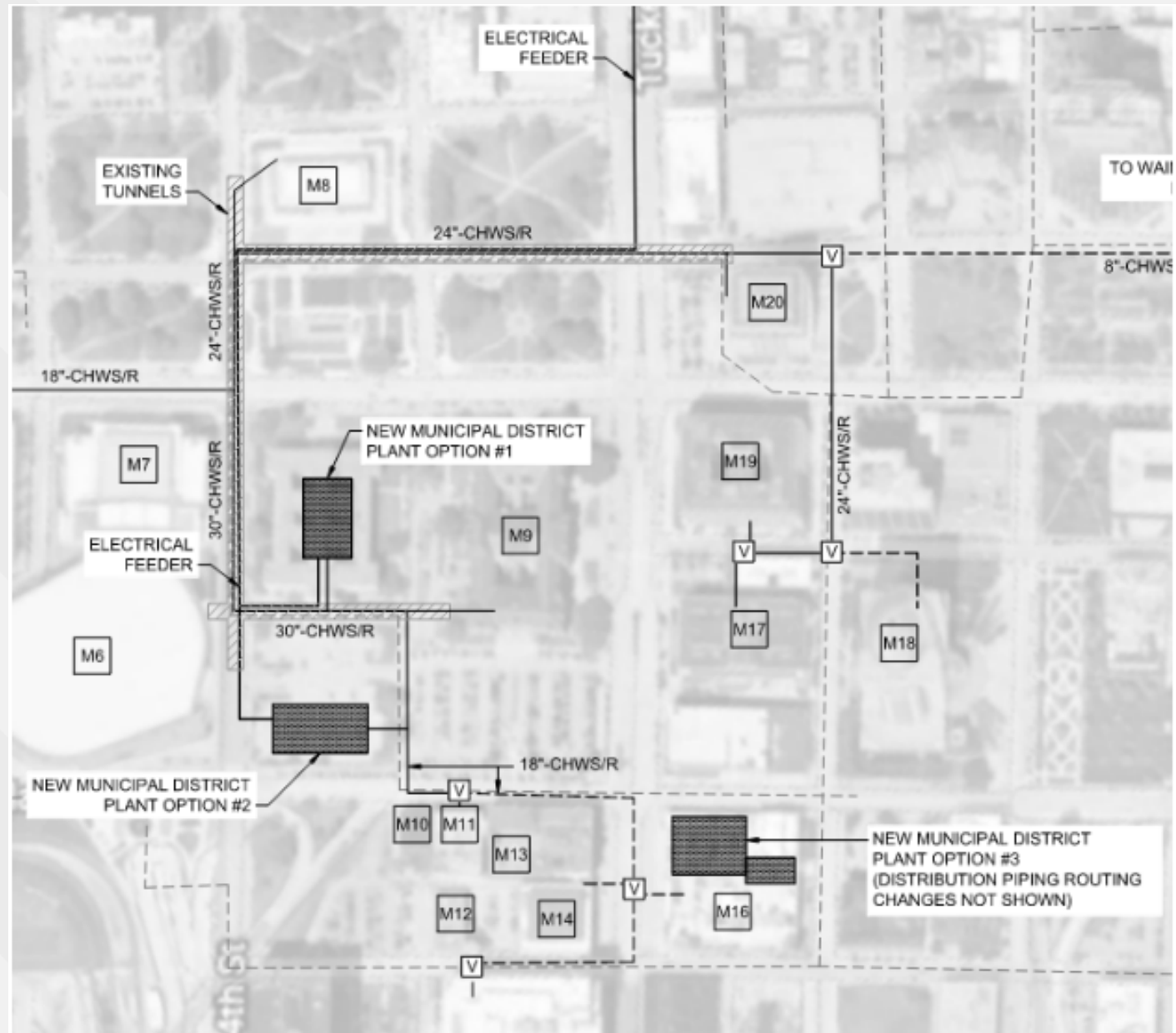
Phase 1		Phase 2		Phase 3	
<u>Building Name</u>	<u>Tons¹</u>	<u>Building Name</u>	<u>Tons¹</u>	<u>Building Name</u>	<u>Tons¹</u>
SLMPD Headquarters (New)	370	Wainwright Office Building	540	Soldiers Memorial Museum	60
1520 Market Street Building	1,080	USPS Facility	1,220	Medical Examiner	20
City Hall	360	Robert Young Federal Building	2,370	SLMPD Communications	40
City Forensics Lab	90	Thomas F. Eagleton US Courthouse	2,700	Police Academy	60
St. Louis City Justice Center	840			Fire Department/Municipal Garage	20
Carnahan Courthouse	500				
Civil Courts Building	790				
Total	4,390	Total	6,830	Total	200

¹Demand data (tons) includes coincidence factor.

► Phase 1, 2, 3: 0-5, 5-10, 10-20 years

CHW Plant Locations

- ▶ Locate near existing tunnel system
- ▶ Locate near city buildings
- ▶ Three options explored
- ▶ AE focusing on Option 3



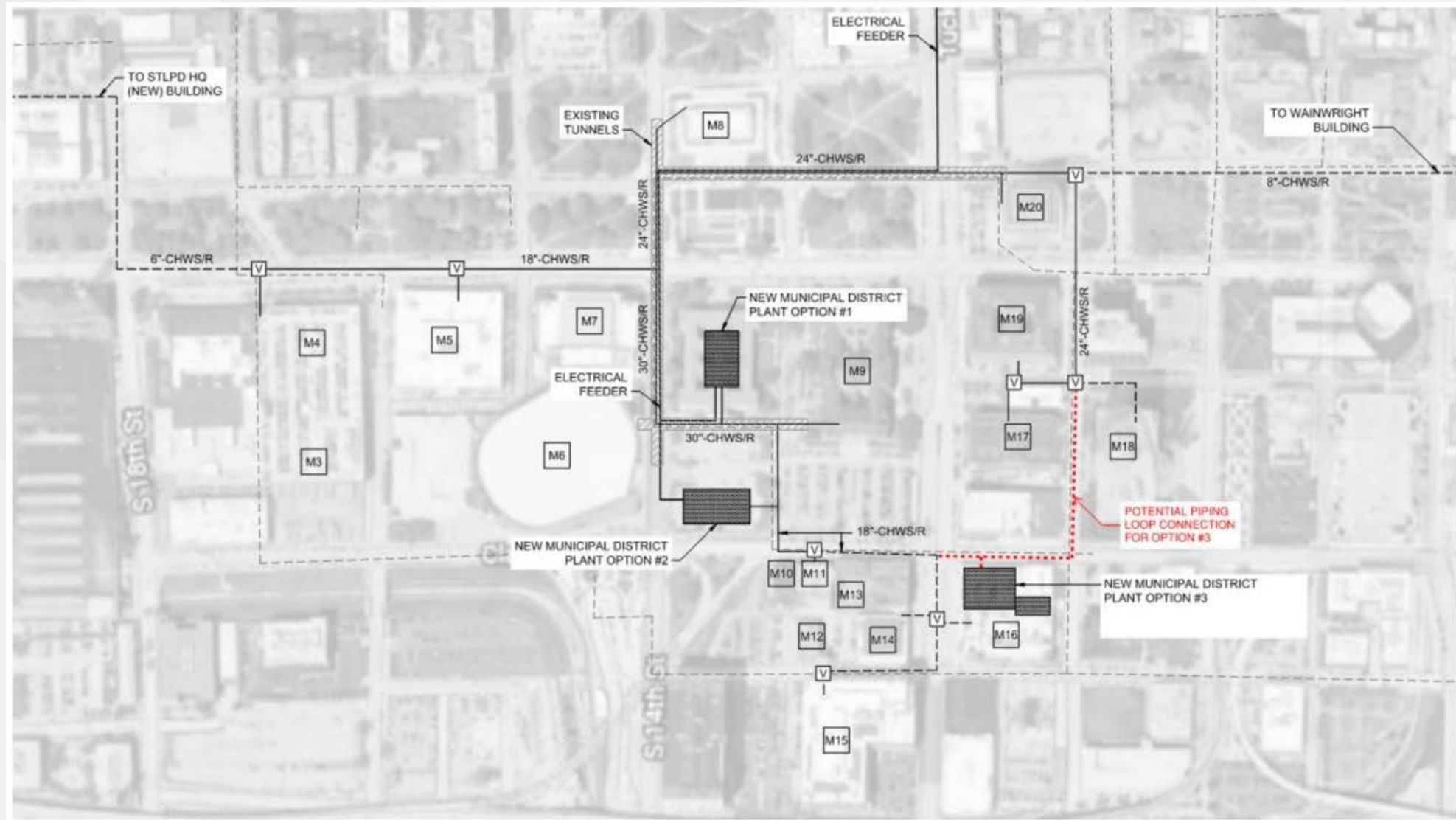
CHW System

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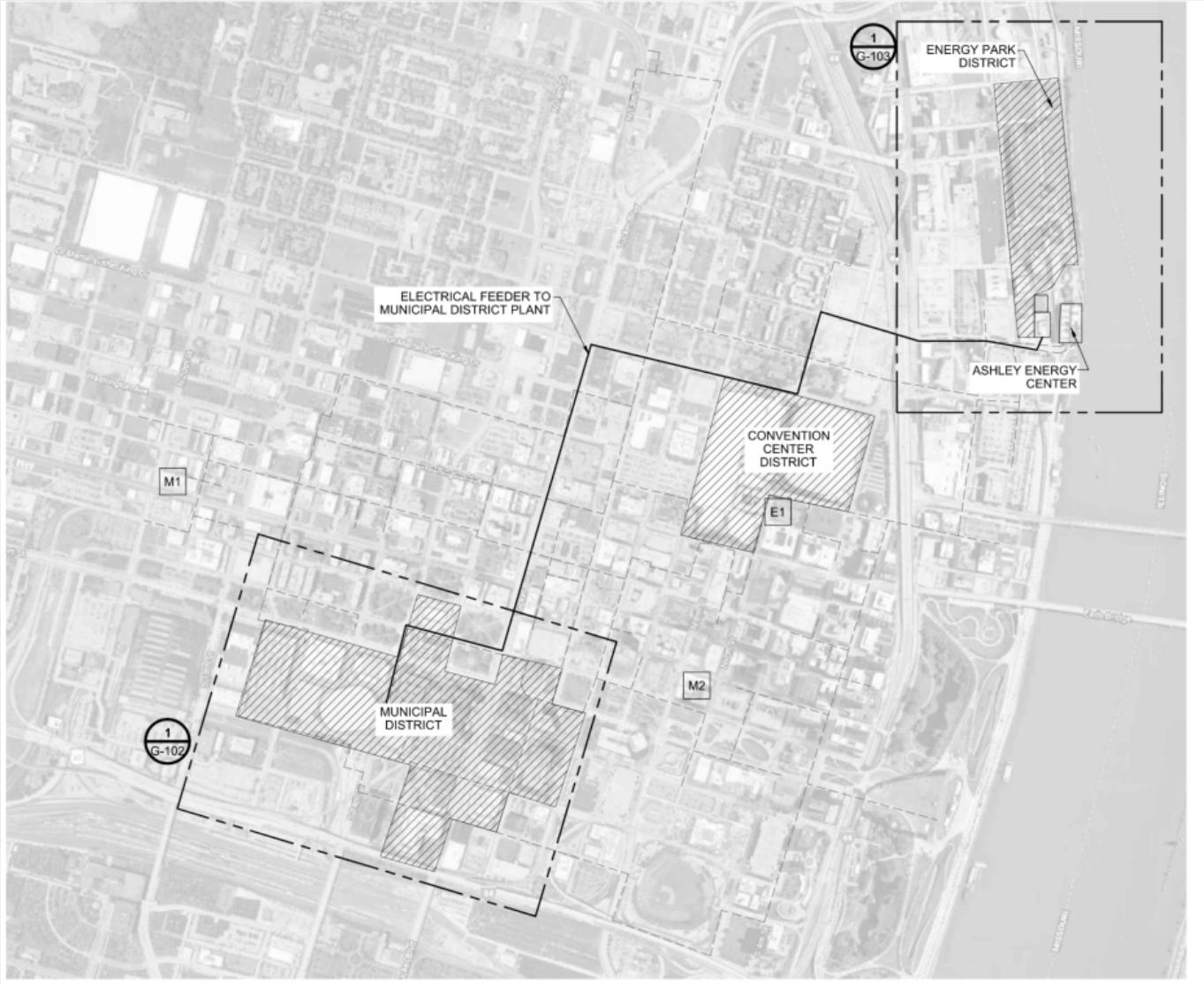
- ▶ Technologies (steam, elec, TES, delta T,...)
- ▶ Costs
 - Operating
 - Capital
 - Payback
- ▶ Schedule Considerations
- ▶ Customer Cost Approximations

- ▶ 6 x 2,300 ton electric chillers (full buildout)
 - First phase is three chillers
- ▶ 6 x 6,900 gpm cooling towers
- ▶ CHW and condenser water pumps
- ▶ Distribution piping
 - Tunnels or sleeved/preinsulated steel pipe for direct bury
- ▶ High voltage (13.8 kV) feeder extension
 - Ductbank w/ 9 x 5" conduits in 3x3 configuration

CHW Distribution

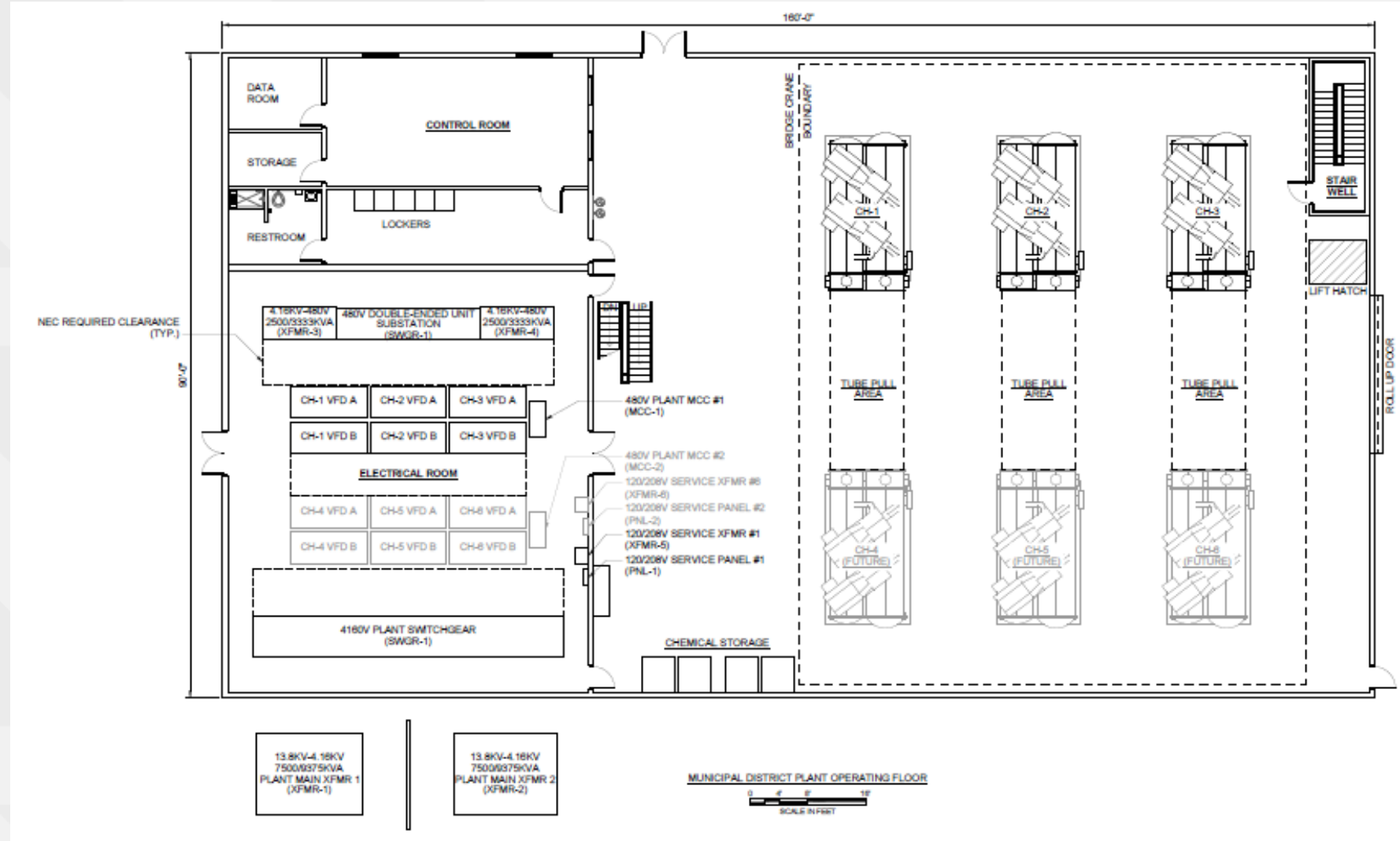


Electrical Feeds



A Compelling Story

- ▶ District System Advantages
- ▶ Safety
- ▶ Efficiency
- ▶ Resiliency
- ▶ Environmental



Current Status

- ▶ Due Diligence
- ▶ Financing
- ▶ Political
- ▶ Design Development



Project Development

- ▶ Building load confirmation
- ▶ Garage assessment
- ▶ Distribution routing investigation / potholing
- ▶ Distribution modeling for design verification
- ▶ Electrical feed route assessment (following existing ROW?)
- ▶ Building transfer station investigations



The background of the slide is a photograph of a city skyline across a body of water. A multi-arched bridge spans the water in the middle ground. Several boats, including a large group on a pontoon boat and a few kayakers, are visible on the water. The city skyline features several tall skyscrapers, with one particularly prominent one on the left. The sky is a clear, light blue.

Q&A

Condition Assessment, Planning, and Continued Opportunity

Thank You



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