

De-Carbonizing the Campus: Planning, Tools & Technologies

CampusEnergy2023

February 27 – March 2, 2023

Gaylord Texan Resort & Convention Center | Grapevine, Texas



INTERNATIONAL
DISTRICT ENERGY
ASSOCIATION

Powering Through: UMB Committed to the Future

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UNIVERSITY of MARYLAND
BALTIMORE



RMF
Engineering



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UMB ELECTRICAL DISTRIBUTION UPGRADES

PROJECT OVERVIEW



6-YEAR PHASED CONSTRUCTION FUNDING

7 CONSTRUCTION PHASES



MIRRORED SWITCHING STATIONS

NORTH AND SOUTH CAMPUS



INCREASED CAPACITY - FUTURE GROWTH

SUPPORTS GREEN TECHNOLOGIES



CAMPUS-WIDE CONTROL SYSTEM

INCREASED RELIABILITY



10+ MW CONNECTED GENERATION

STANDBY POWER



14 MV FEEDER PAIRS

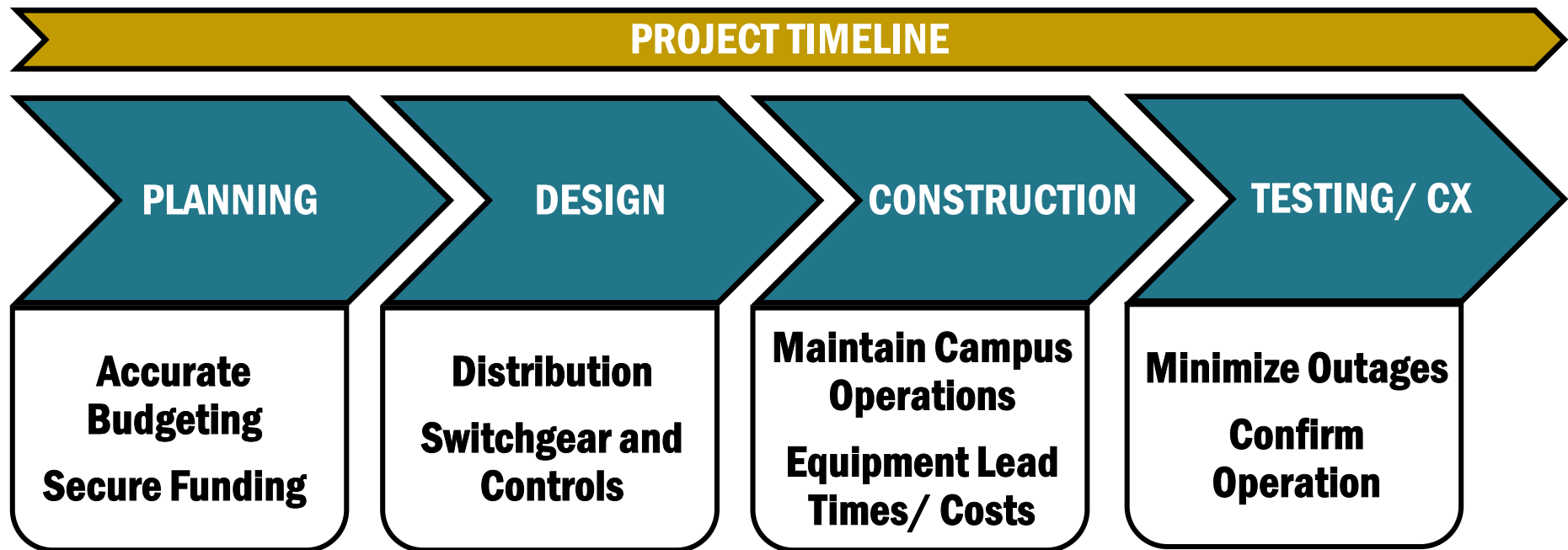
DUAL RADIAL DISTRIBUTION



8 INTERCONNECTED UTILITY FEEDERS

INCREASED RELIABILITY

PROJECT APPROACH AND CHALLENGES



PLANNING – PROGRAM AND BUDGETING

Outage History – Paca Street

Feeder/Bus	Year							Total per Feeder/Bus
	2009	2010	2011	2012	2013	2014	2015	
110595	0	0	0	1	0	0	0	1
110596	0	0	0	0	0	0	0	0
110597	0	0	0	0	0	0	0	0
110598	0	0	0	0	0	0	0	0
Substation Bus	0	0	0	0	0	0	0	0
Total per Year	0	0	0	1	0	0	0	1 outage

**Note: Data run from 2005-2015 for distribution, transmission, and substation bus. Years 2005-2008 not shown because there were no recorded outage events before 1/15/09.

Outage History - Greene Street

Feeder/Bus	Year							Total per Feeder/Bus
	2009	2010	2011	2012	2013	2014	2015	
13868	1	0	1	0	0	0	0	2
13869	0	0	0	1	0	0	0	1
13870	0	0	0	0	0	0	0	0
13871	0	0	0	0	0	0	0	0
110553	0	1	0	0	0	3	1	5
110554	1	0	0	0	0	0	0	1
Substation Bus	0	0	0	0	0	1	0	1
Total per Year	2	1	1	1	0	4	1	9 outages

**Note: Data run from 2005-2015 for distribution, transmission, and substation bus. Years 2005-2008 not shown because there were no recorded outage events before 1/15/09.

PLANNING – PROGRAM AND BUDGETING

TABLE 4-4: FEEDER AND DUCTBANK COST COMPARISON--NORTH SITES
UNIVERSITY OF MARYLAND BALTIMORE

	OPTION NO. 1 (RECYCLING CENTER)	OPTION NO. 2 (255 PEARL ST)	OPTION NO. 3 (PEARL ST INFILL)
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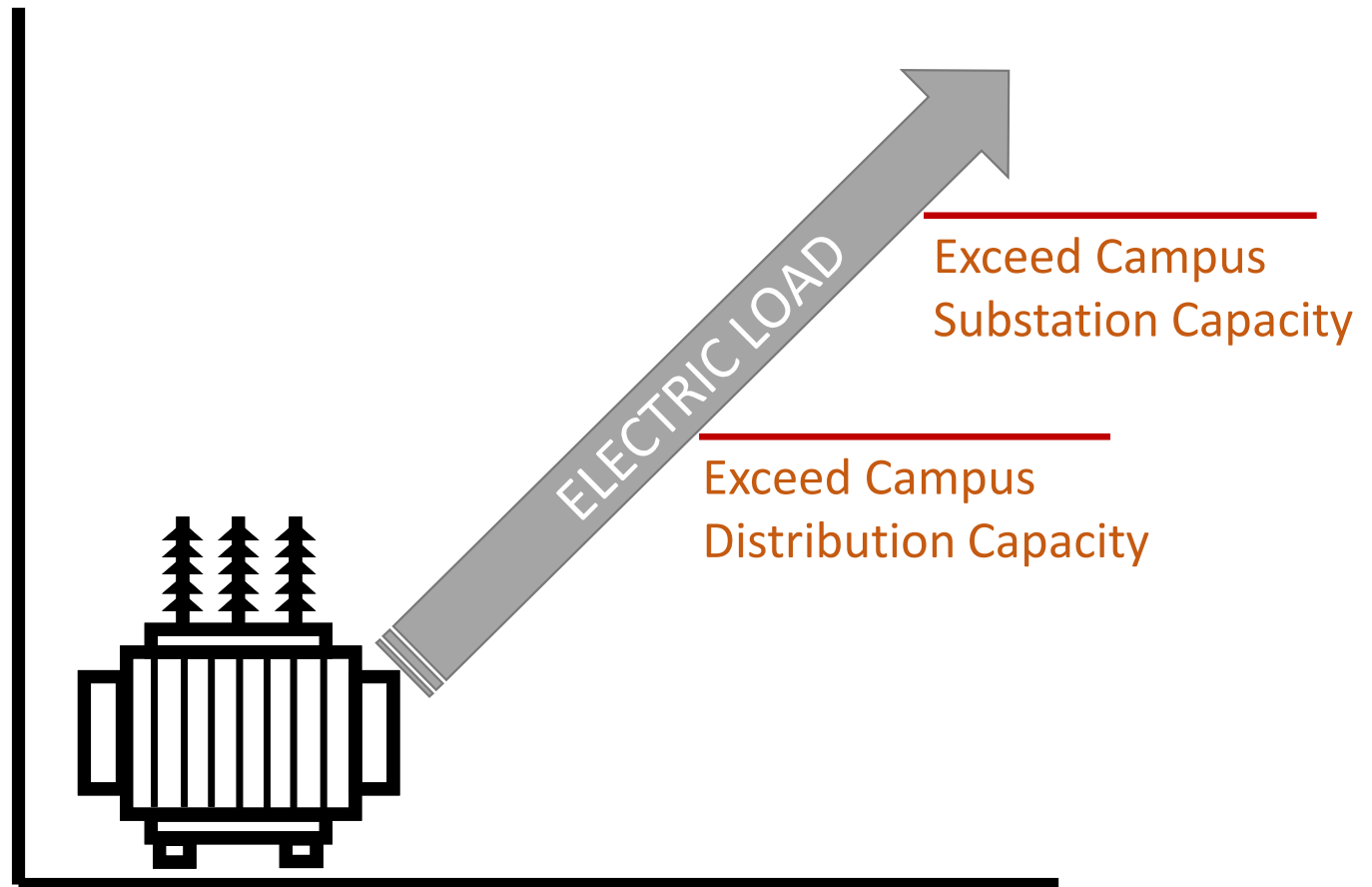
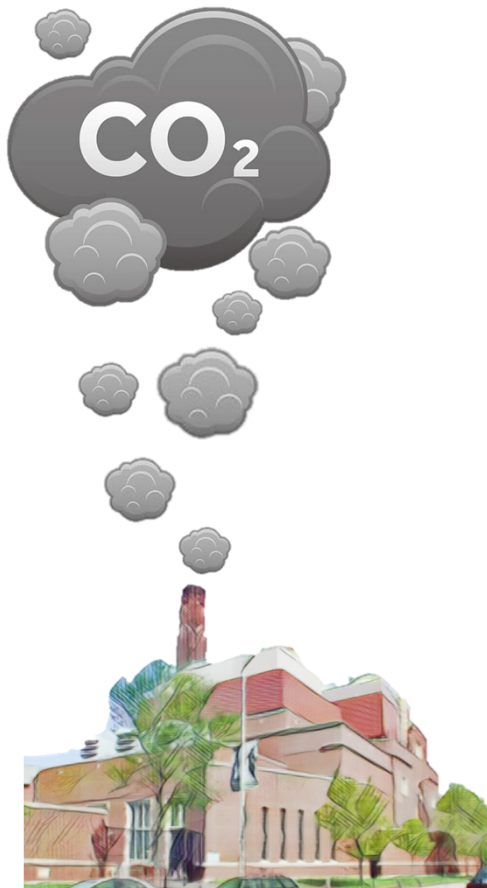
TABLE 4-5: TOTAL PROJECT COSTS SUMMARY--NORTH SITES
UNIVERSITY OF MARYLAND BALTIMORE

OPTION NO.	DESCRIPTION	PHASE 1 COSTS									TOTAL PROJECT COSTS (\$)
		FEEDER COSTS (\$)	DUCTBANK COSTS (\$)	SWITCH STATION COSTS (\$)	BUILDING DEMO COSTS (\$)	NEW BUILDING COSTS (\$)	FLOODING CORRECTION COSTS (\$)	SITE COMPLEXITY COSTS (\$)	CONST. COSTS (\$)	30% SOFT COSTS (\$)	
1	RECYCLING CENTER	5,524,000	11,179,000	5,000,000	500,000	1,200,000	---	---	23,403,000	7,021,000	30,424,000
2	255 PEARL ST	5,824,000	12,080,000	5,000,000	---	1,200,000	---	---	24,104,000	7,231,000	31,335,000
3	PEARL ST INFILL*	4,151,000	12,845,000	5,000,000	---	1,200,000		2,000,000	25,196,000	7,559,000	32,755,000

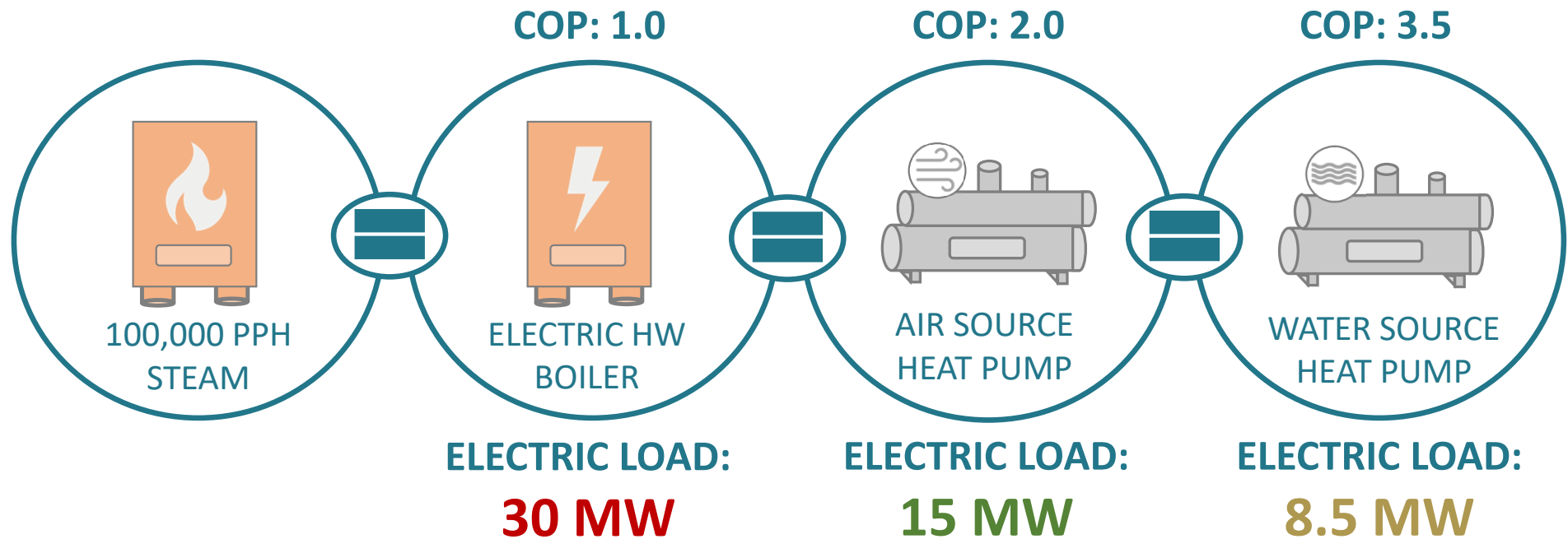
* Due to the extensive relocation of underground utilities required, this site is not considered viable.

SUBTOTAL	---	---	2,430	3,360	11,179,000	---	---	2,210	3,700	12,080,000	---	---	2,680	3,580	12,845,000
TOTAL	38,300	17,230	4,860	---	16,703,000	38,300	18,875	4,420	---	17,904,000	38,300	11,233	5,360	---	16,996,000

PLANNING – ENABLING THE FUTURE



PLANNING – ENABLING THE FUTURE



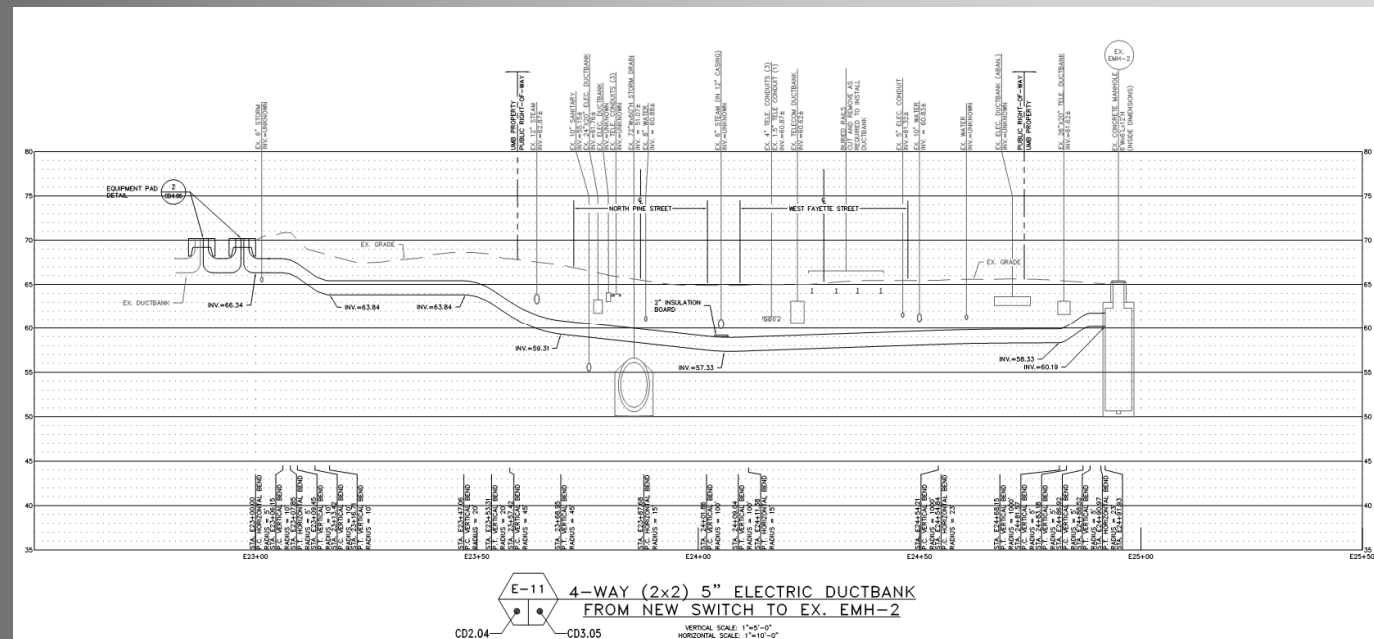


DESIGN – DUCTBANK CONSIDERATIONS

- Cable size
- Existing utilities
- Pull tension
- Constructability

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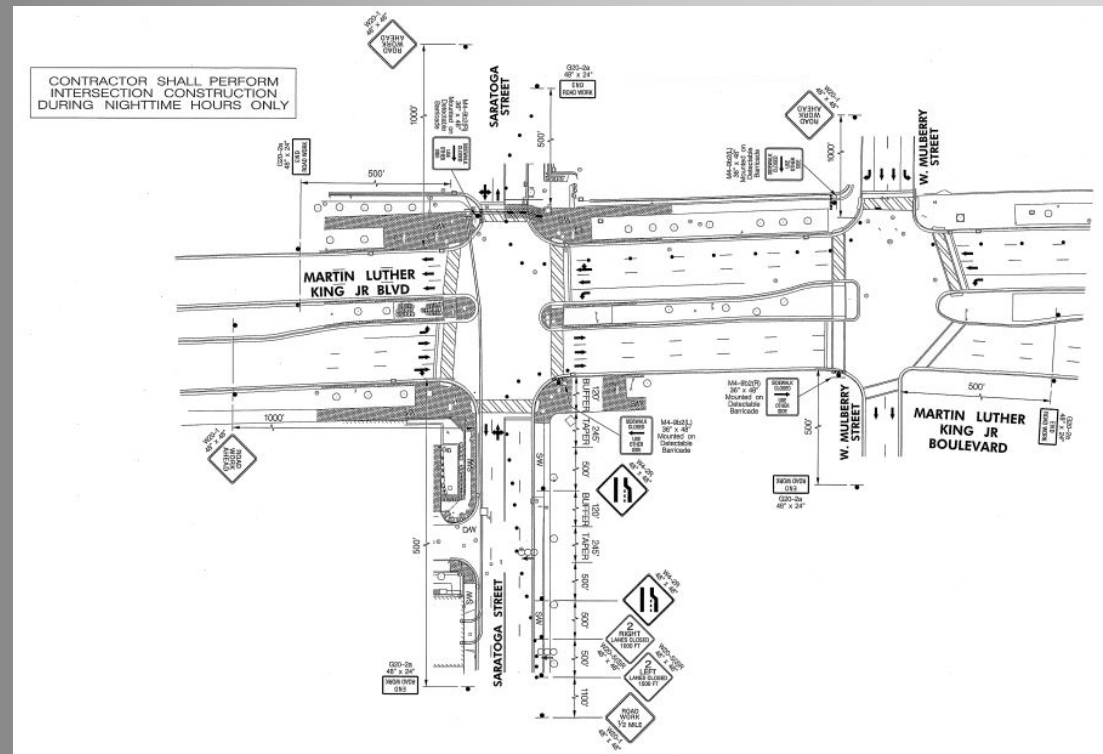
DESIGN – MAINTAINING CAMPUS OPERATIONS

- Vehicle Traffic
- Pedestrian Traffic
- Emergency Access
- Construction Laydown



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