Riverview Health Westfield Hospital

Midwest Healthcare Engineering Conference & Trade Show

The Environment of Care

November 8, 2021

Riverview HEALTH

AMERICAN STRUCTUREPOINT INC.

CMTA

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Agenda

- Overview
- High-Performance Design Features
- Hospital Energy Usage Overview
- High-Performance Design Results
- Discussion

Riverview HEALTH

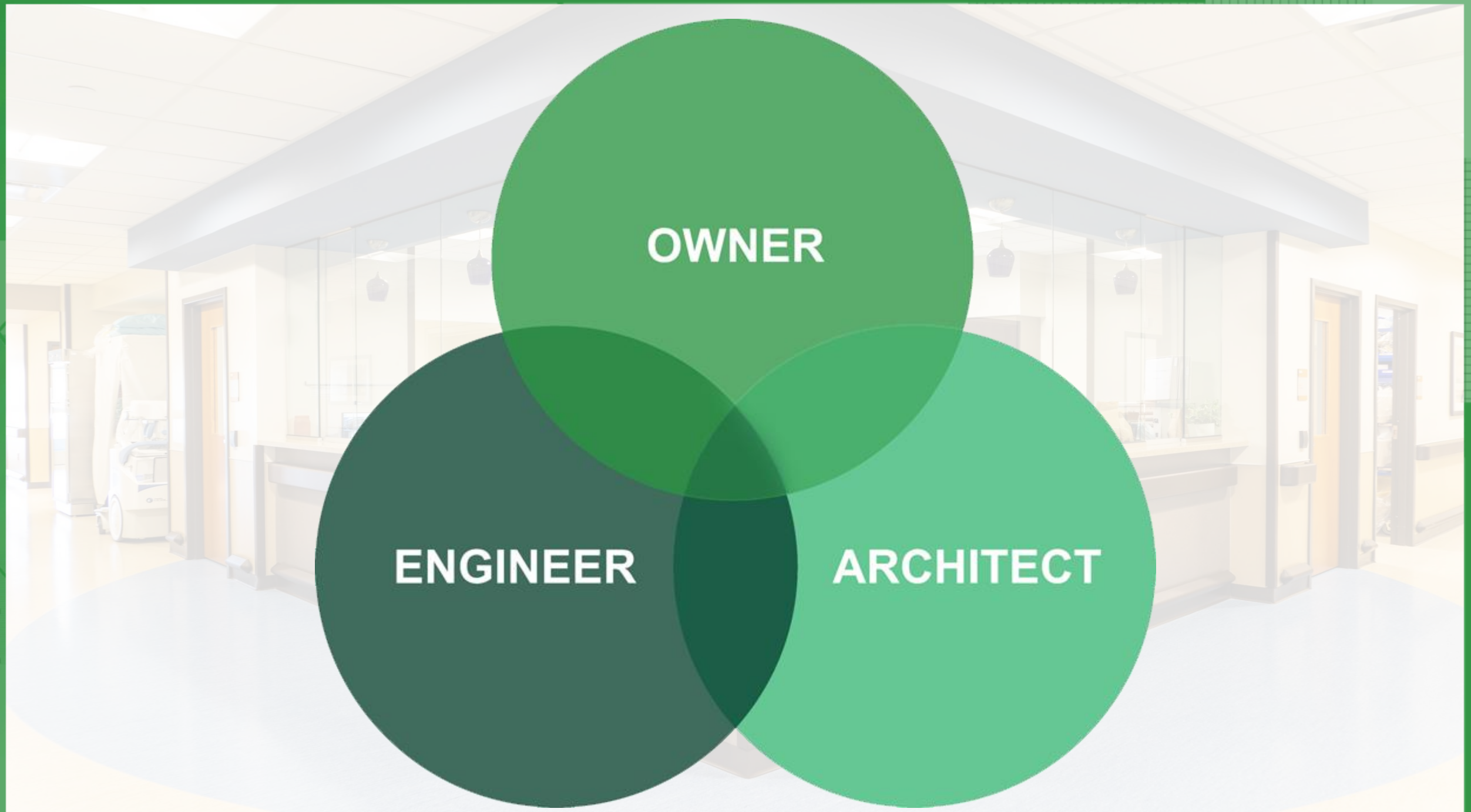
Founded 1909 | 25 Locations | 176 Inpatient Beds
350+ Physicians | 35+ Medical Specialties | 5 ER/UC

Riverview HEALTH

Riverview Health Westfield Hospital

107,000 SF | 20 Inpatient Beds

7 Outpatient Beds | 3 ORs | 9 ED Exam Rooms

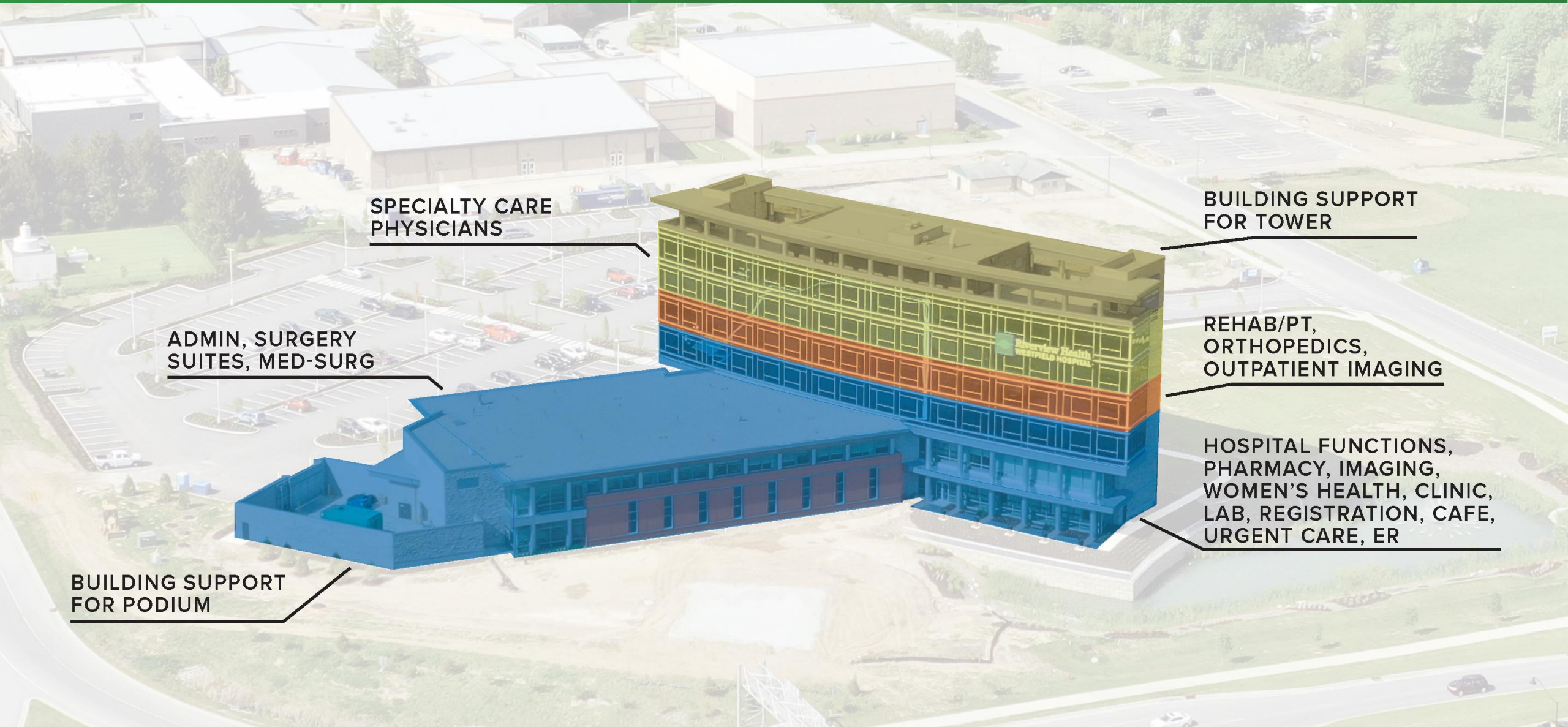

OWNER
ENGINEER
ARCHITECT

Riverview HEALTH

Owner's Design Objectives

- High-Performance Envelope
- High-Performance Systems
- Patient-Centric
- Flexibility
- Visibility

Program Stacking Diagram



Hospitality

Patient Orthopedic Suite

Full-Service Facility

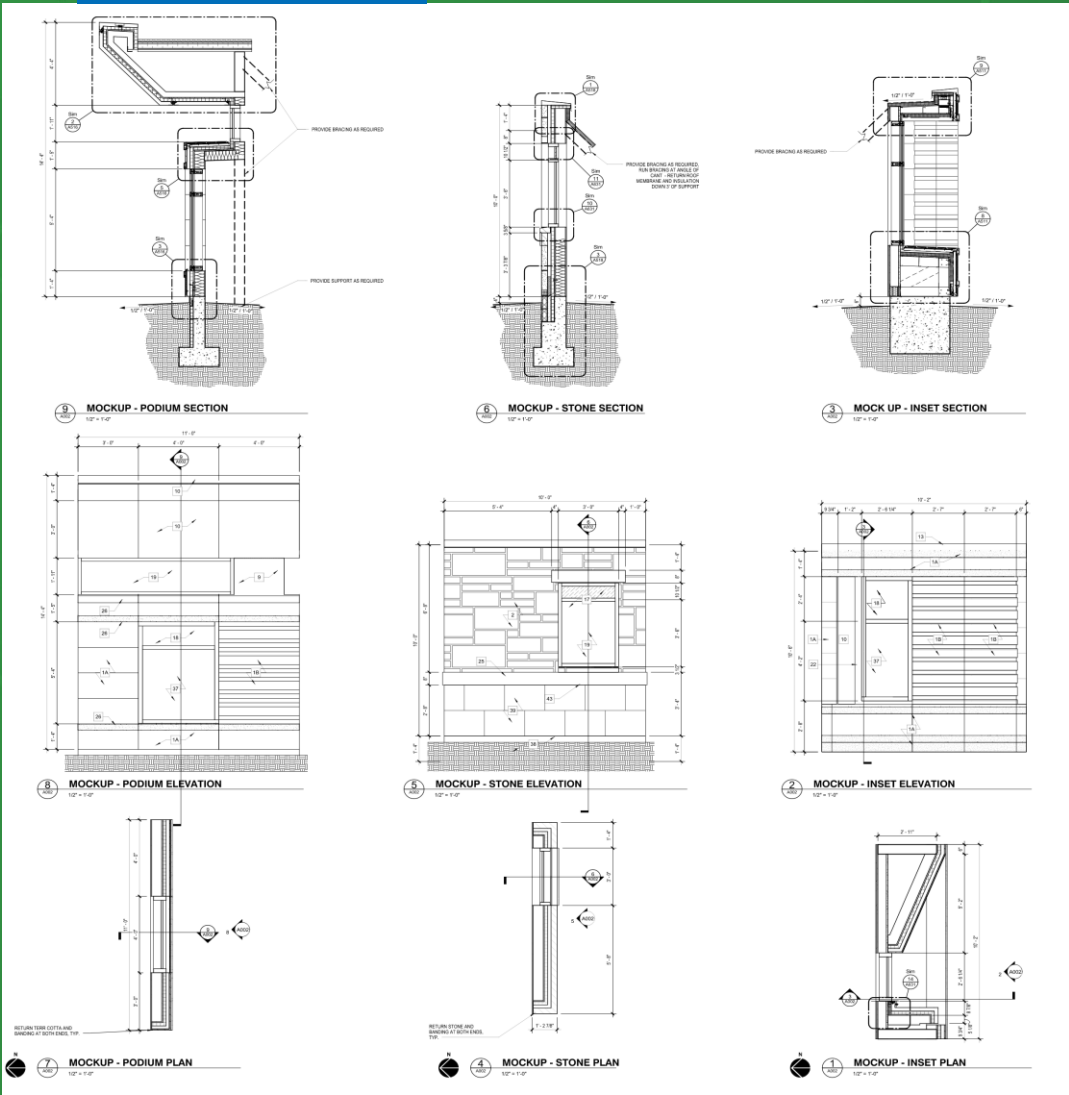
Emergency & Urgent Care

Surgery Suites

Architect

- Improved Building Envelope
  - Roof
  - Walls
  - Curtain Wall
  - Building / Wall Mock-Ups
- Site Orientation

Envelope Design

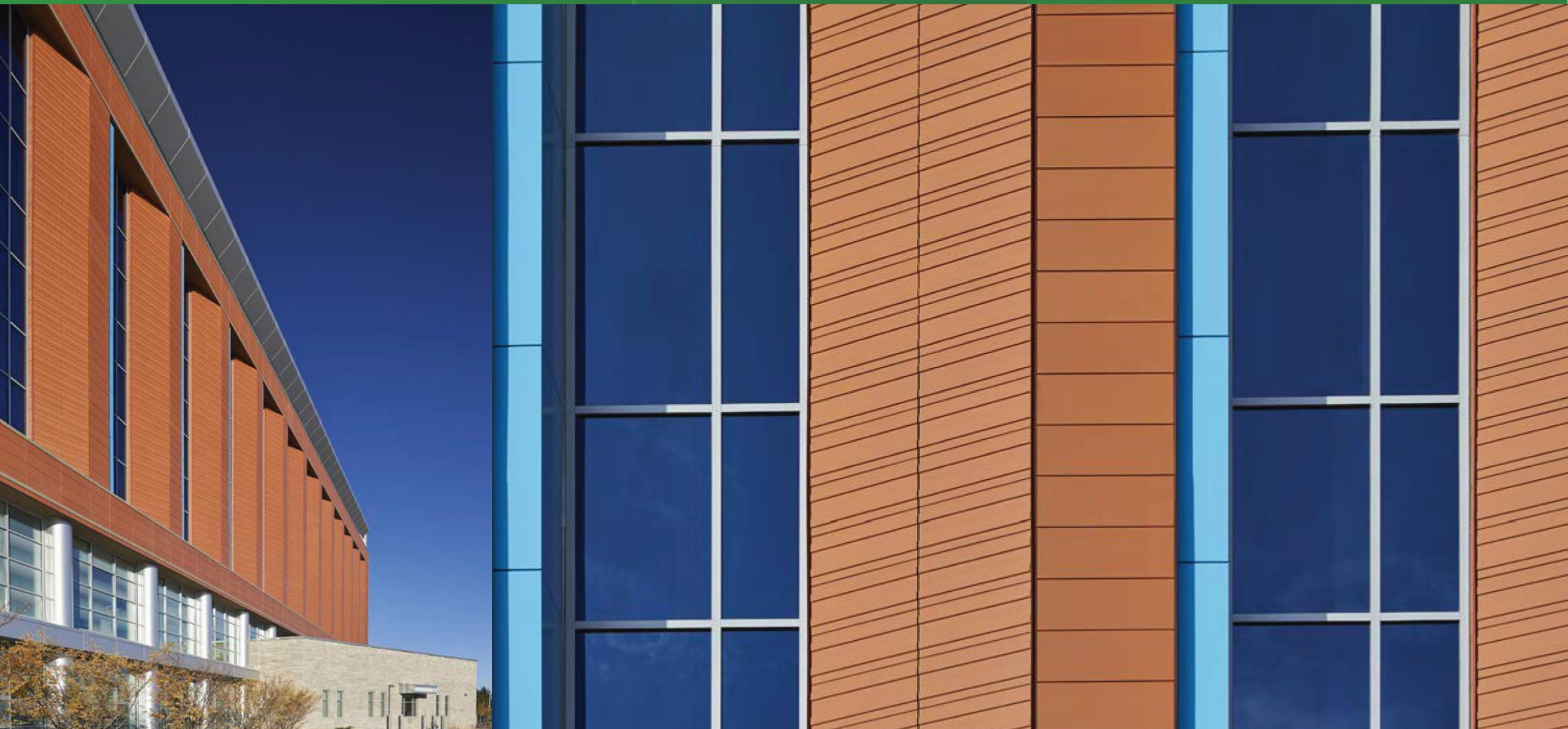


High-Performance Design

- Solar Orientation
- High-Performance Curtain Wall System
  - Low-E Glazing, High Solar Reflectivity, Blue Tint (Branding)
- Terra-Cotta Rainscreen System
  - Thinner Profile, Lighter Weight
- R-12 Sprayed Insulation and R-24 Mineral Wool Batt
- Air-Moisture Barrier / Vapor Barrier
- Roof – R20 Base Insulation + Tapered / TPO / Ballasted
- Use of Mock-Up Walls

Curtain Wall Study

Terra-Cotta Rainscreen



Site Layout

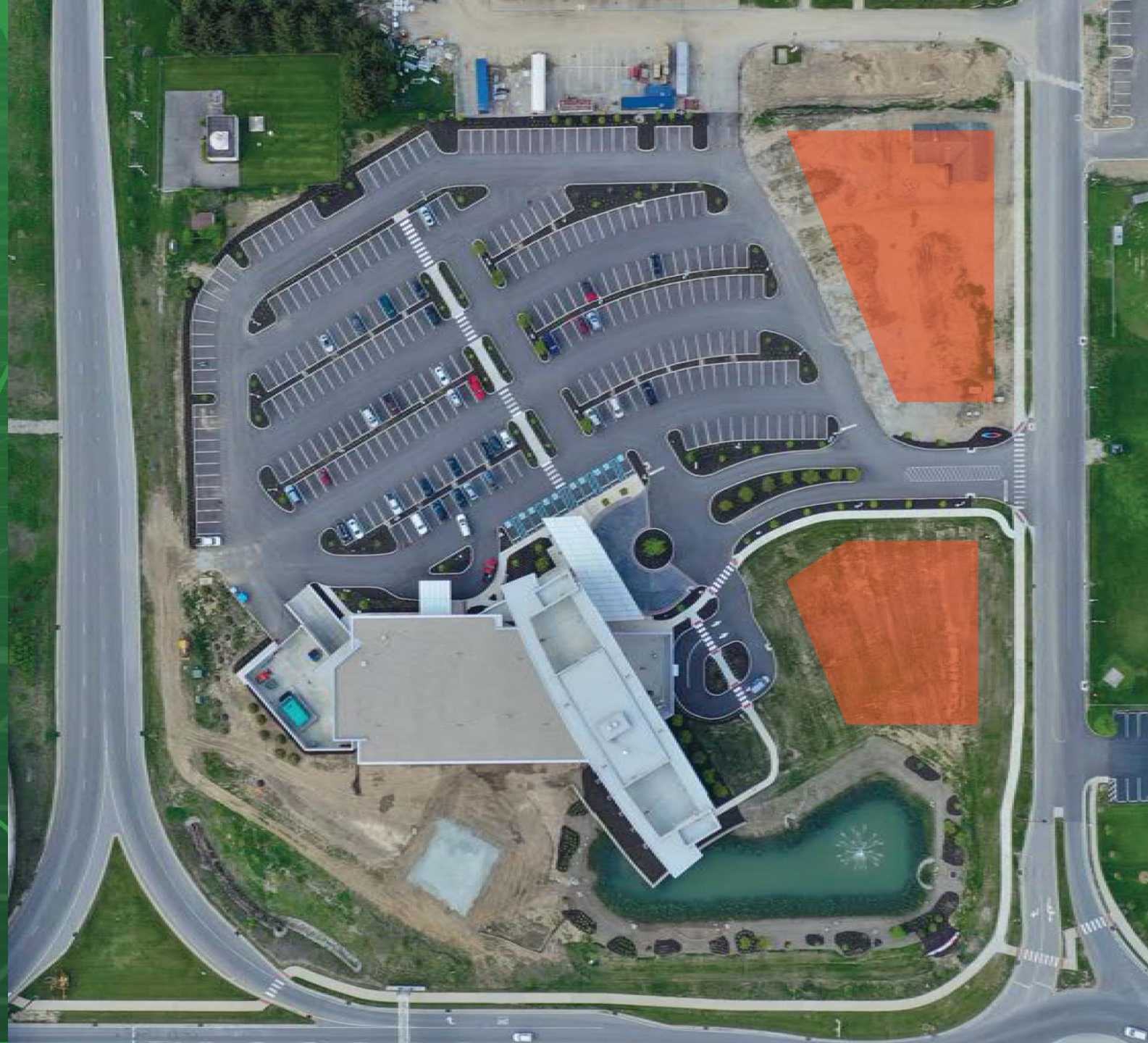
Future Outlots

Helicopter Pad

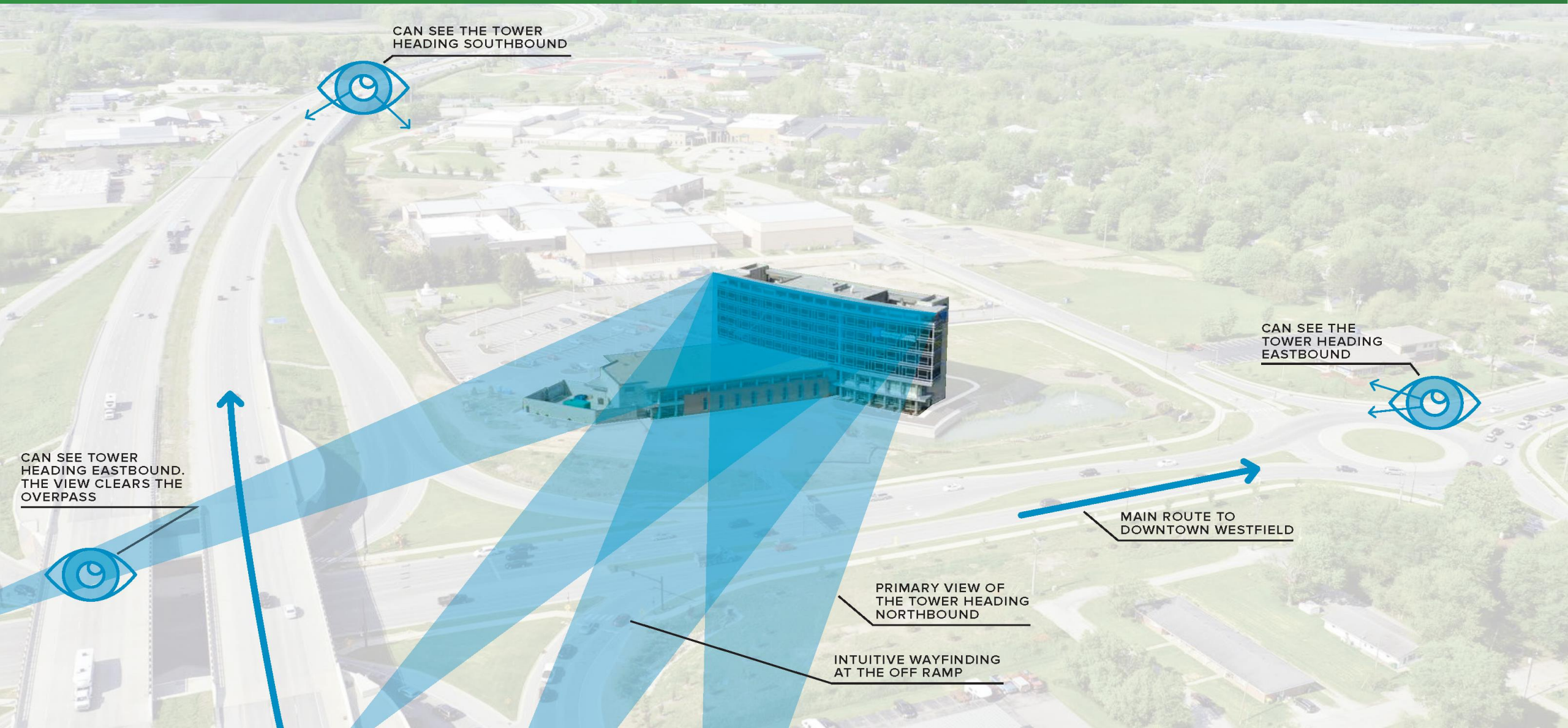
Minimize Detention

Maximize Site

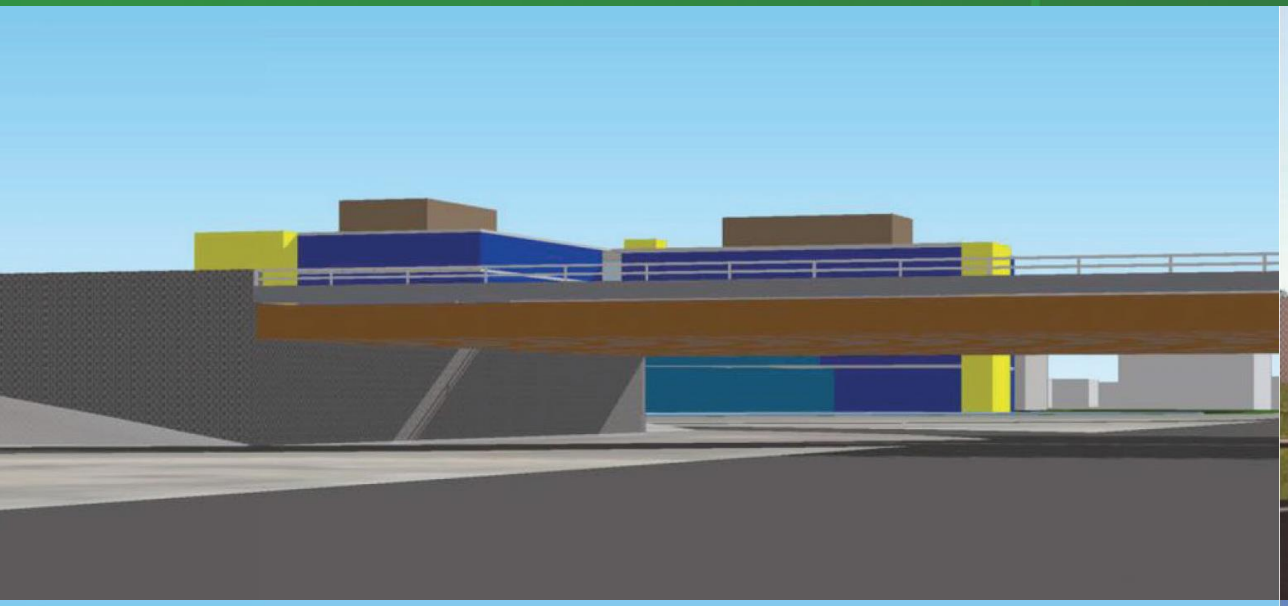
Maximize Greenspace



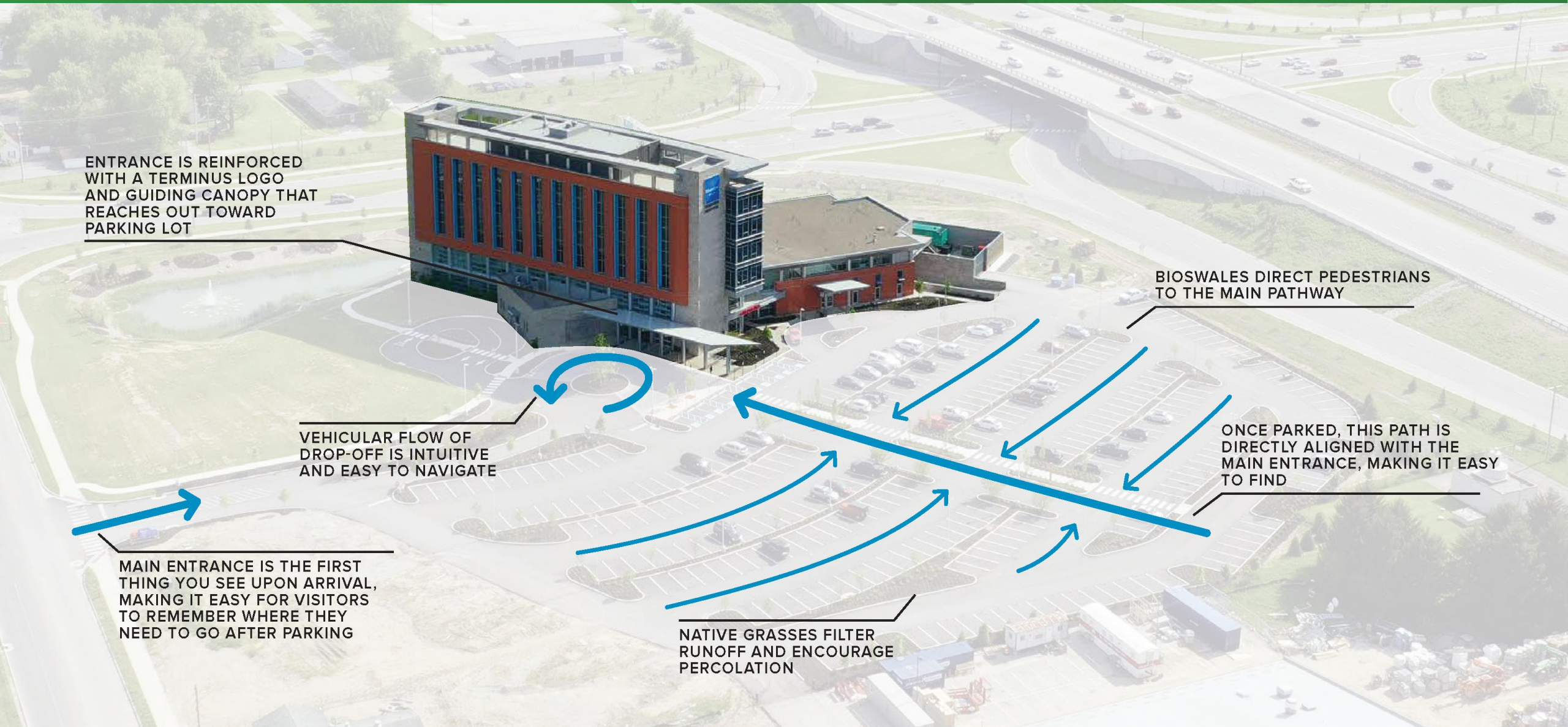
Visibility


CAN SEE THE TOWER HEADING SOUTHBOUND
CAN SEE THE TOWER HEADING EASTBOUND
CAN SEE TOWER HEADING EASTBOUND. THE VIEW CLEARS THE OVERPASS
MAIN ROUTE TO DOWNTOWN WESTFIELD
PRIMARY VIEW OF THE TOWER HEADING NORTHBOUND
INTUITIVE WAYFINDING AT THE OFF RAMP

Building Massing



Wayfinding


ENTRANCE IS REINFORCED WITH A TERMINUS LOGO AND GUIDING CANOPY THAT REACHES OUT TOWARD PARKING LOT
BIOSWALES DIRECT PEDESTRIANS TO THE MAIN PATHWAY
VEHICULAR FLOW OF DROP-OFF IS INTUITIVE AND EASY TO NAVIGATE
ONCE PARKED, THIS PATH IS DIRECTLY ALIGNED WITH THE MAIN ENTRANCE, MAKING IT EASY TO FIND
MAIN ENTRANCE IS THE FIRST THING YOU SEE UPON ARRIVAL, MAKING IT EASY FOR VISITORS TO REMEMBER WHERE THEY NEED TO GO AFTER PARKING
NATIVE GRASSES FILTER RUNOFF AND ENCOURAGE PERCOLATION

Wayfinding

Engineer

- Typical Design vs High-Performance Design
- High-Performance Systems
- Ventilation Design
- Lighting and Electrical Distribution
- Energy Efficiency

MEP Design

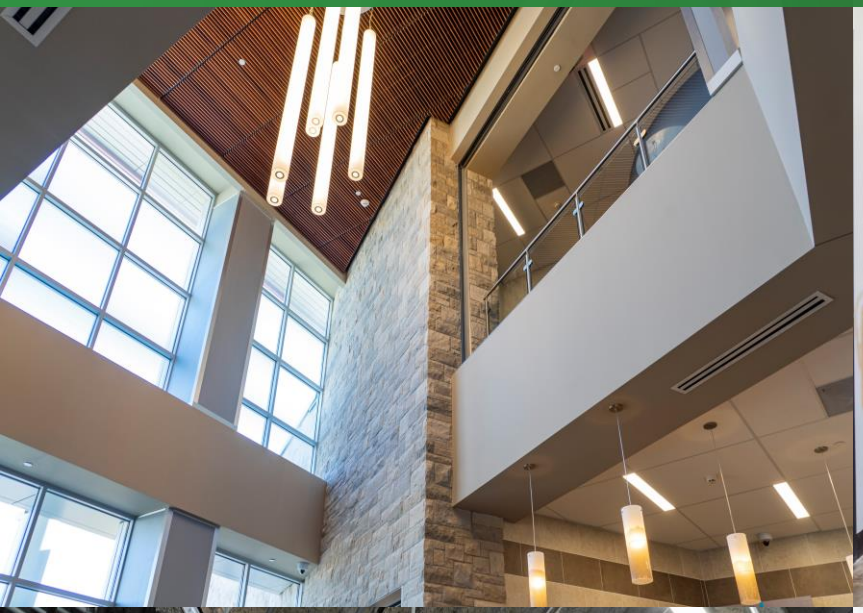
Typical Design

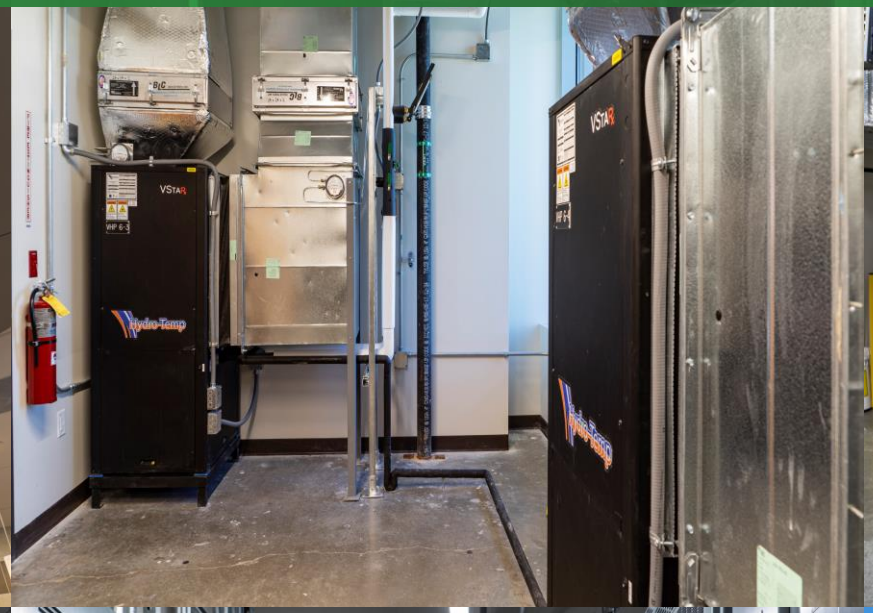
- Boiler (Steam) and Chiller Central Plant
- VAV Systems with Reheat
- Oversized Systems
- Minimum Use of Heat Recovery
- VAV Air Handlers (None Dedicated)
- Code Minimum Lighting (1 W / SF)
- Energy Costs: $3.64 per SF or Higher
- EUI: 234 or Higher

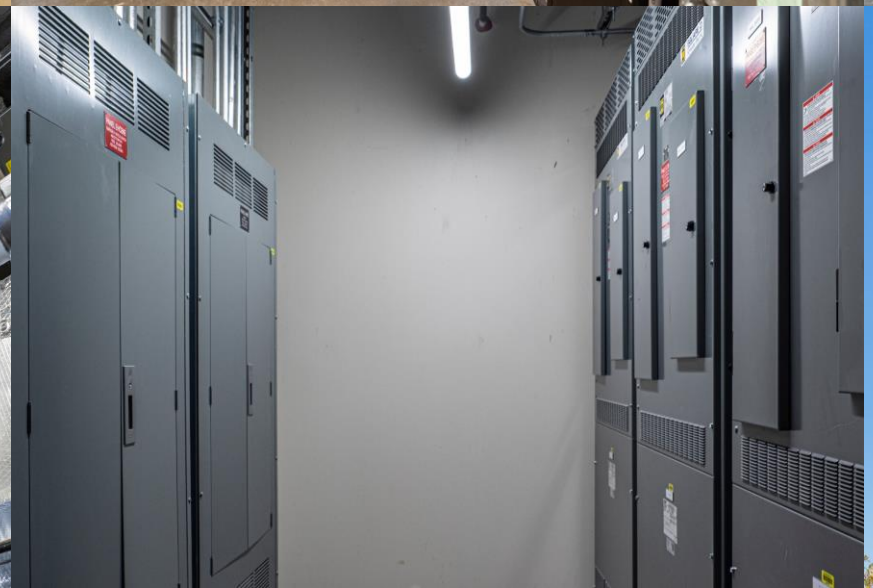
CMTA Design

- Geothermal Central Plant
- Small Steam and Hot Water Reheat Plants
- WSHP Systems with Reheat (Dominant System)
- Surgery VAV Systems with Reheat
- Heat Recovery Systems
- Separate Dedicated Ventilation Systems
- Better-than-Code Lighting (Less than 0.6 W / SF)
- “Right Sized” MEP system
- Energy Costs: Below $2.08 / SF
- EUI: 105

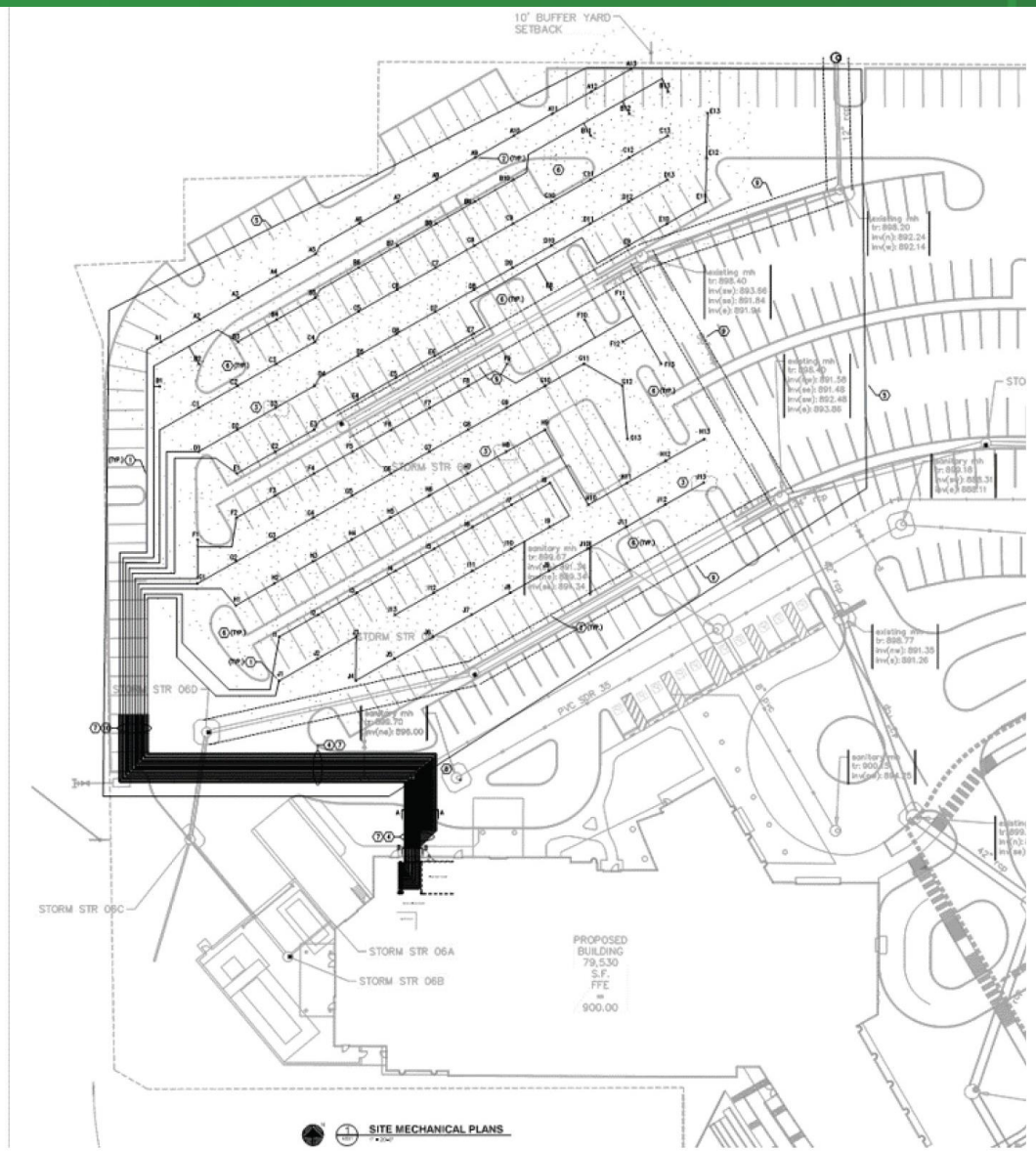
High-Performance Systems







Geothermal


10' BUFFER YARD SETBACK
STORM STR 06D
STORM STR 06C
STORM STR 06A
STORM STR 06B
PROPOSED BUILDING 79,530 S.F. FFE = 900.00
SITE MECHANICAL PLANS

G.S.
G.R.

G.S.

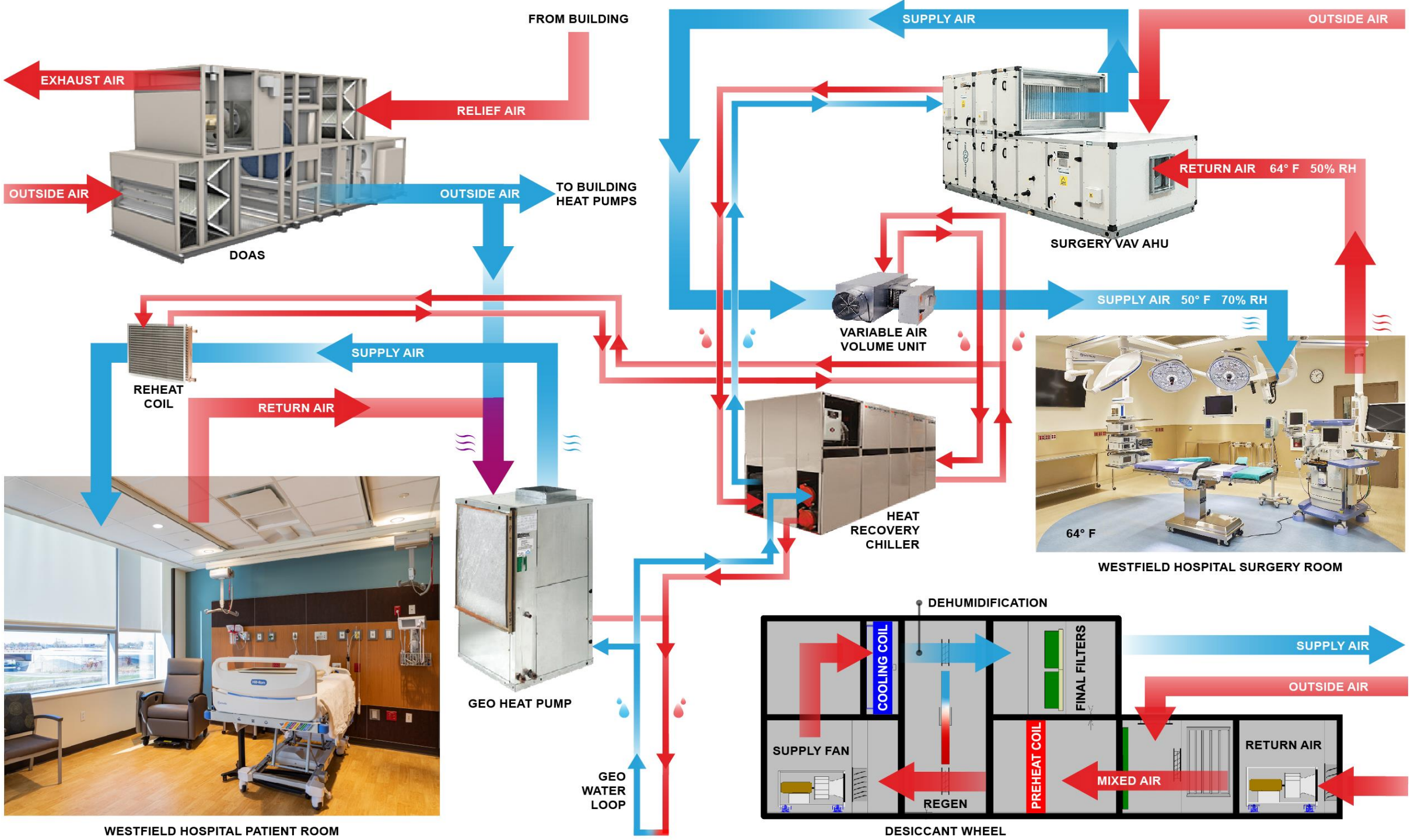
Geo-Exchange Heat Pump Systems

Ventilation System (DOAS)

Surgery Air Handling Units (VAV)

MEP Systems – Well Water Cooled VRF

Chilled Water Generation


FROM BUILDING
EXHAUST AIR
RELIEF AIR
OUTSIDE AIR
OUTSIDE AIR
TO BUILDING HEAT PUMPS
DOAS
SUPPLY AIR
OUTSIDE AIR
SURGERY VAV AHU
RETURN AIR 64° F 50% RH
VARIABLE AIR VOLUME UNIT
SUPPLY AIR 50° F 70% RH
REHEAT COIL
SUPPLY AIR
RETURN AIR
HEAT RECOVERY CHILLER
64° F
WESTFIELD HOSPITAL SURGERY ROOM
GEO HEAT PUMP
GEO WATER LOOP
WESTFIELD HOSPITAL PATIENT ROOM
DEHUMIDIFICATION
COOLING COIL
FINAL FILTERS
SUPPLY AIR
OUTSIDE AIR
SUPPLY FAN
PREHEAT COIL
RETURN AIR
MIXED AIR
REGEN
DESICCANT WHEEL

Steam / Hot Water

100% LED Lighting

IPAC Electrical Distribution

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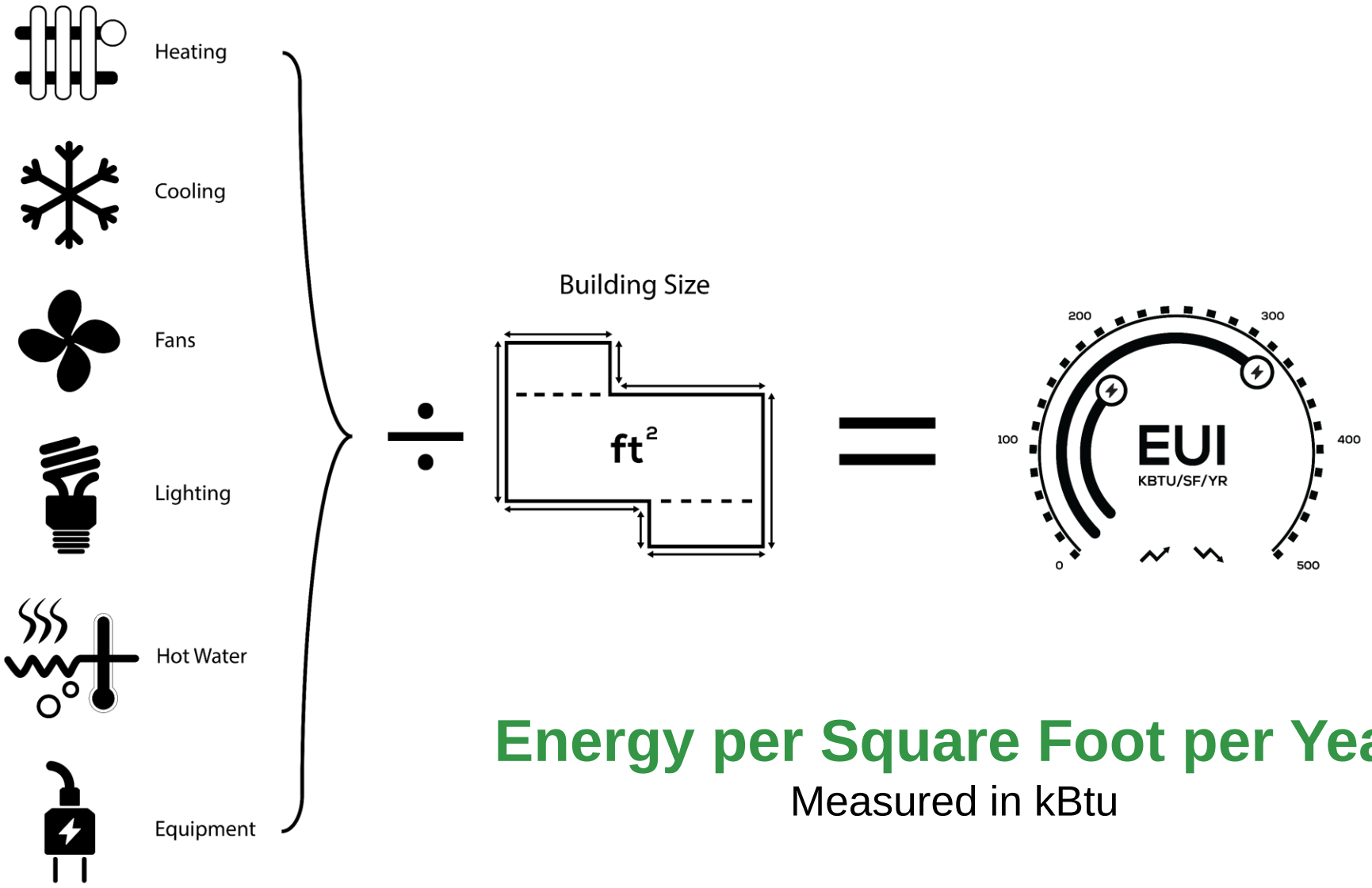
Why is Energy Efficiency Important?

EUI Overview

Energy Breakdown

Sustainability

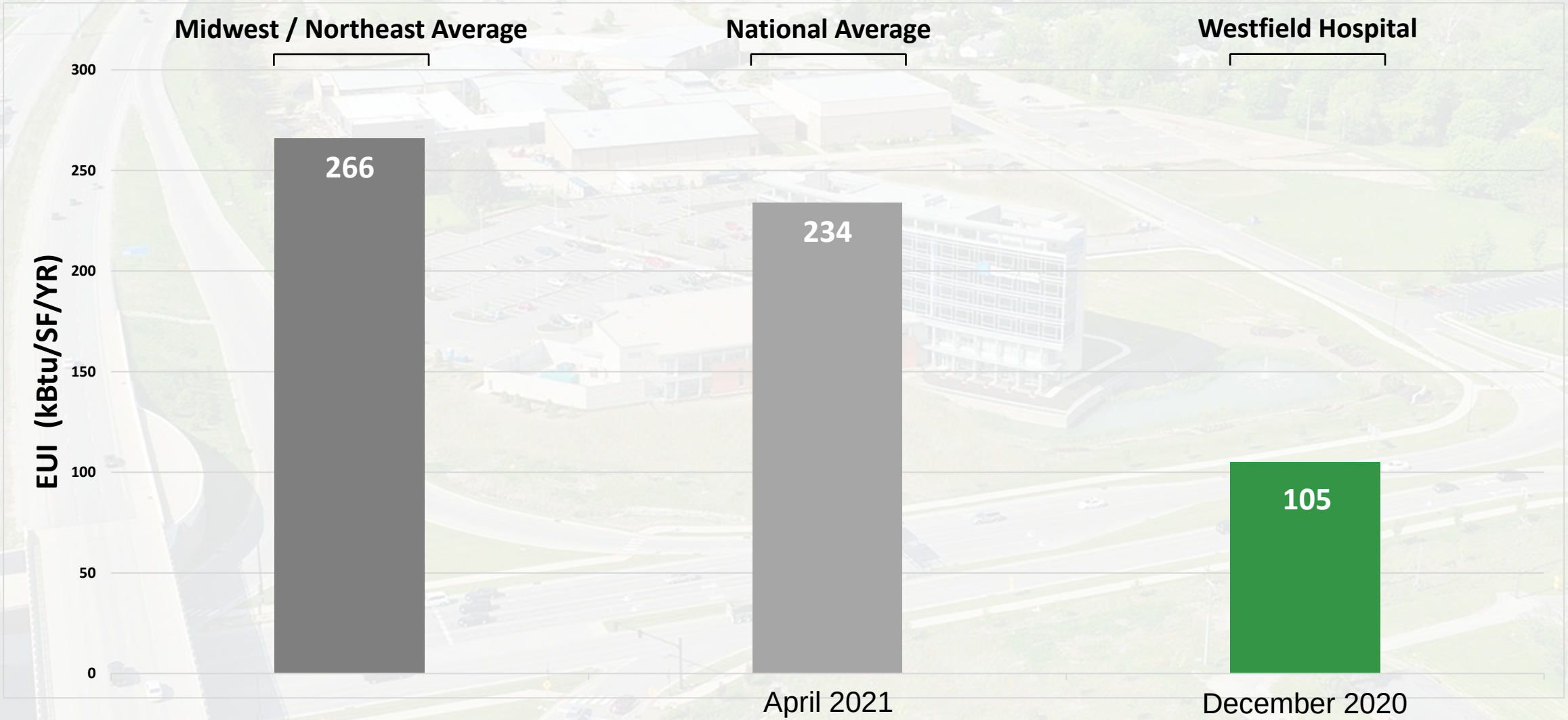
What is EUI?



Energy per Square Foot per Year

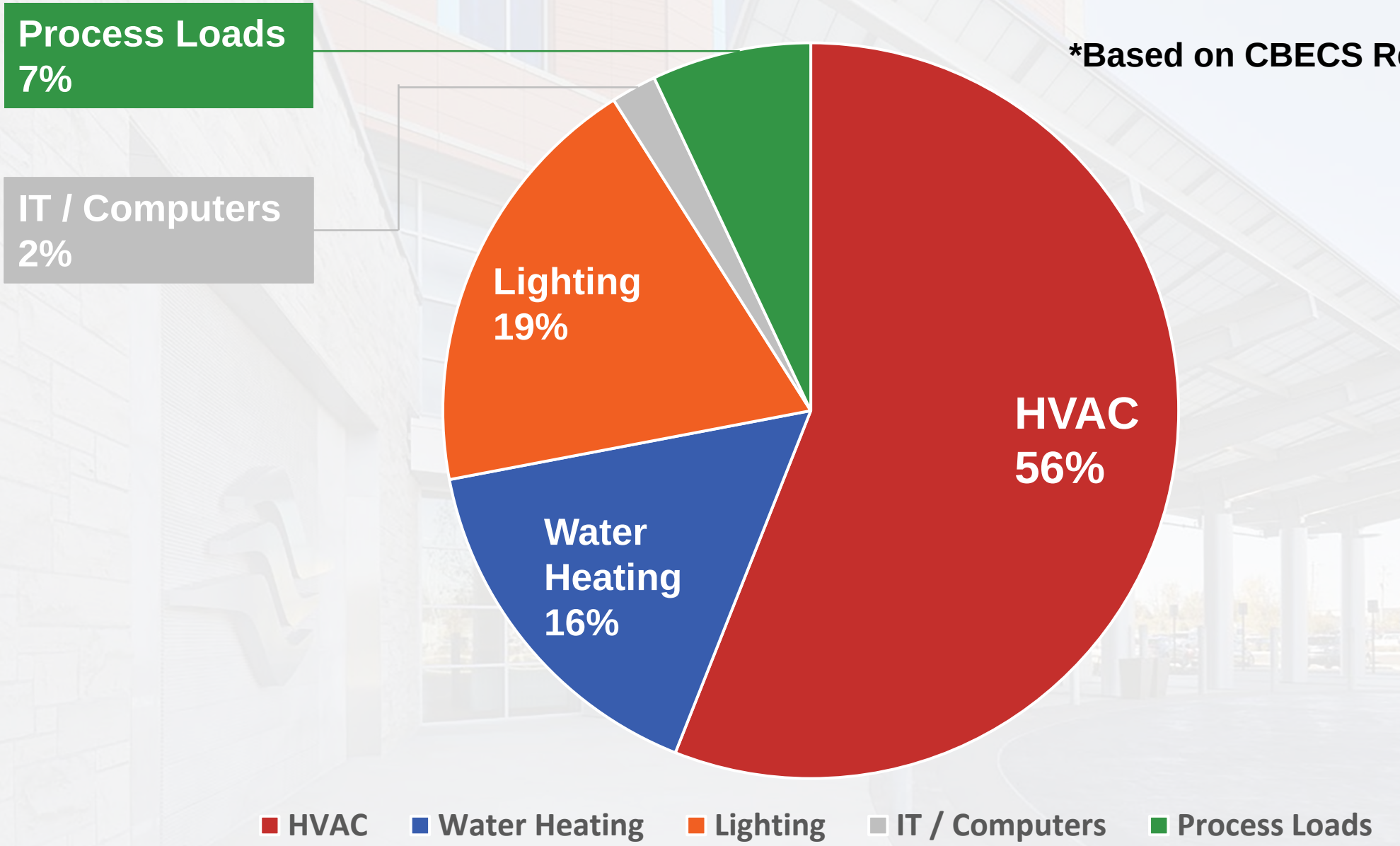
Measured in kBtu

Hospital EUI



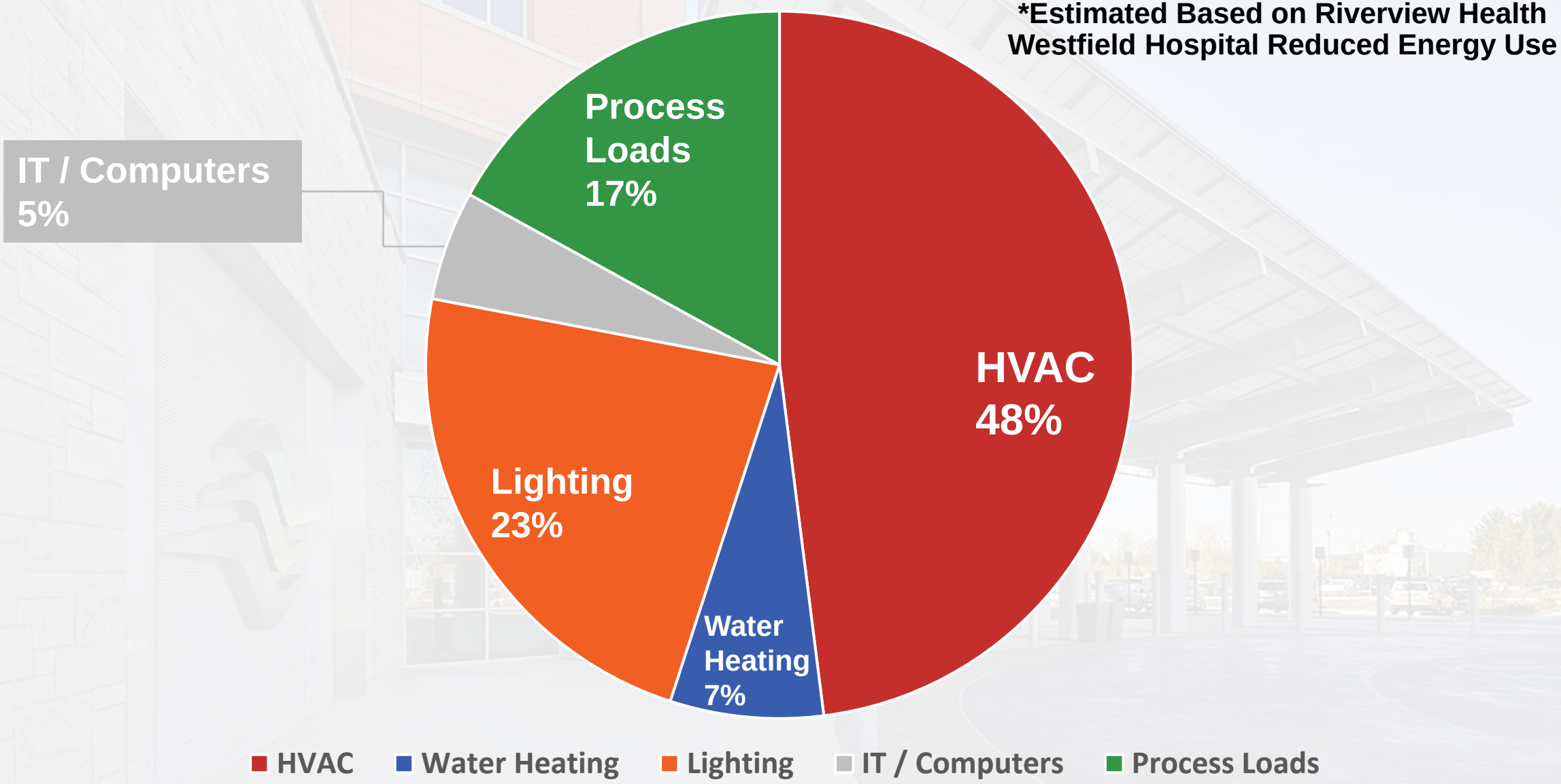
Regional Hospital Energy Breakdown

*Based on CBECS Regional Data

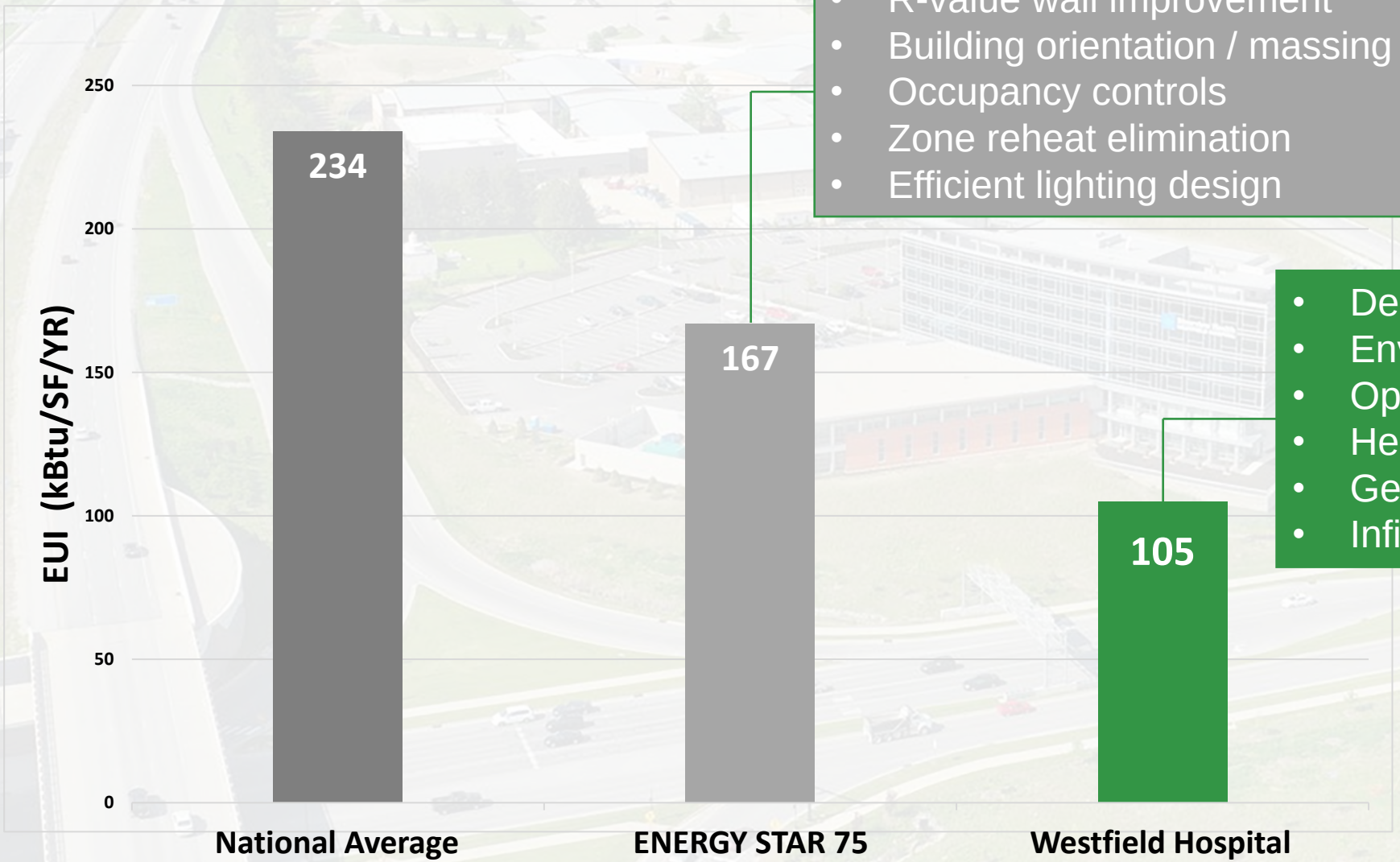


Riverview Health Westfield Hospital Energy Breakdown

*Estimated Based on Riverview Health Westfield Hospital Reduced Energy Use



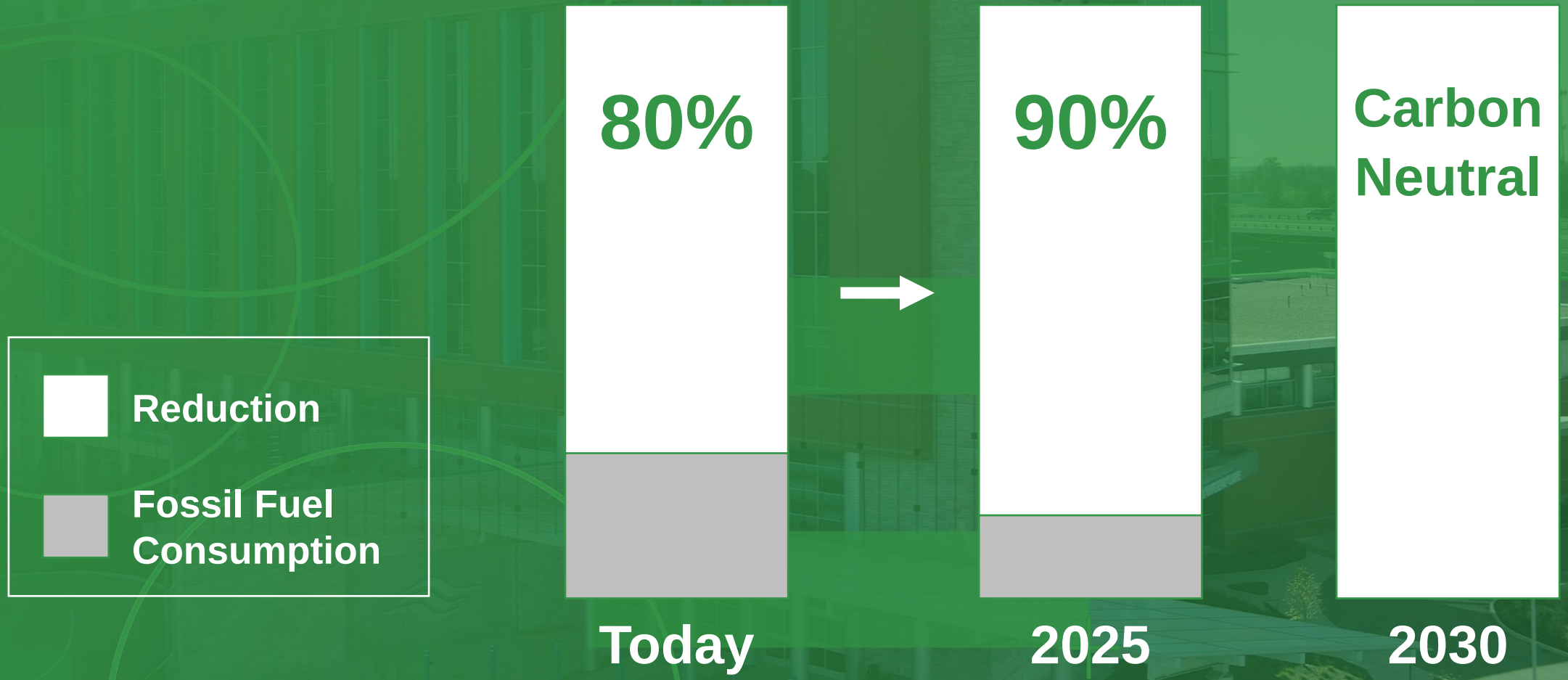
Hospital EUI



- R-value wall improvement
- Building orientation / massing
- Occupancy controls
- Zone reheat elimination
- Efficient lighting design

- Dedicated ventilation
- Envelope commissioning
- Optimized surgery HVAC
- Heat recovery chillers
- Geo-Exchange
- Infiltration improvements

AIA 2030 Challenge



ENERGY STAR Target Finder

Riverview Health Westfield Hospital

	Project	Average	Annual Savings
ENERGY STAR Score	100	50	
EUI (kBtu/sf/yr)	105	234	
Energy Costs	$222,214	$495,220	
			$273,000

Commercial Buildings Energy Consumption Survey (CBECS) Data
December 2020

ENERGY STAR

The WOW! Factor

- $273,000 Annual Energy Savings
- One of the Most Energy-Efficient Hospitals
- Reduced Operational Cost
- Improved Healthcare Services

Riverview
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Questions
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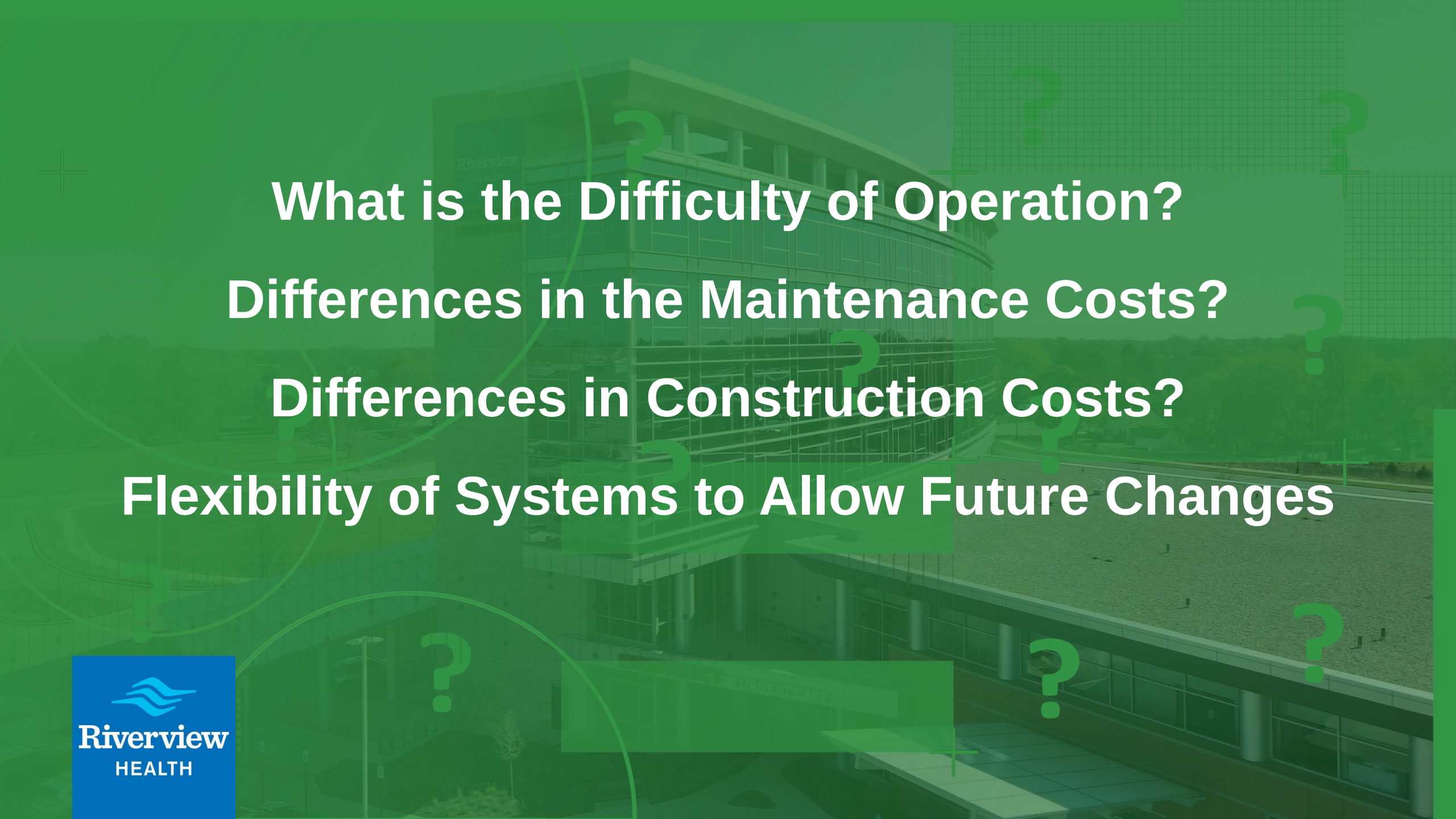

What is the Difficulty of Operation?

Differences in the Maintenance Costs?

Differences in Construction Costs?

Flexibility of Systems to Allow Future Changes

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Lessons Learned

Planning of Geothermal

Complexity of the Heat Recovery

Complexity of VRF Controls

Constant Review & Controls Commissioning

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