

LAWRENCE SECONDARY SCHOOLS MASTERPLAN

February 14, 2017

gouldevans

Foreword

In addition to the critical need for a highly qualified and effective teacher for every classroom, the physical environment of a school plays a role in student success. When designed with students in mind, school environments can stimulate learning.

A successful school bond election in 2013, enabled Lawrence Public Schools to redesign, reconstruct and renovate 14 elementary schools, including some 80-, 90- and 100-year-old facilities. The school board and district leadership seized this opportunity to reimagine the concept of the learning spaces within our schools. Driving the planning and design process was the district's commitment to personalizing student learning through a blend of the best of teacher-directed instruction with digital learning to improve student engagement, motivation, and success.

In personalized learning environments, we extend the reach of teachers by tailoring instruction to individual student strengths, needs, and interests, including giving students voice and choice in the path, pace, and place of their learning. We empower students to take ownership of their educational goals and support them within and beyond the walls of the traditional classroom.

We already see in our elementary schools the transformative effects of environments designed to support 21st century student-centered learning. The 2017 Lawrence Secondary Schools Master Plan seeks to extend similar benefits to Lawrence middle and high school students. The plan provides safe and secure campuses, addresses equity across facilities and accommodates student enrollment growth. It delivers energy efficient, high performance schools that promote student and staff wellness and success. It constructs flexible spaces inside and outside of classrooms, in corridors, library media centers, multi-purpose and outdoor learning spaces that will enhance students' educational experiences and opportunities to collaborate, create and innovate.

I believe you will see our students at the very heart of this plan.

KYLE HAYDEN, SUPERINTENDENT OF SCHOOLS

Executive Summary

In January 2016, the Lawrence School District engaged Gould Evans to conduct a detailed assessment and masterplan of their two existing high schools and four existing middle schools. This effort encompassed a wide range of information gathering which included observation and walkthroughs of the existing buildings, national precedent research, regional benchmarking tours, student surveys, meetings with faculty, administrators, and members of the USD 497 Board of Education.

A detailed proposal of renovations and improvements to all secondary schools follows. This process was one which received input at every stage from students, their parents, school faculty, administrators, and the facilities planning committee assembled by the Superintendent to the schools.

There were a handful of goals set by the facilities planning committee to be addressed district-wide, including but not limited to: updating existing conditions to embody 21st century learning environments for students and faculty, improvements to safety and security, accommodation for growth at Lawrence's high schools, and overall lessening of the burden of capital outlay and deferred maintenance.

This assessment and proposal of renovations are outlined in the publication that follows, along with a comprehensive summary of the status of MEP systems and sustainability in Lawrence's secondary school facilities.

INFORMATION GATHERING

KICKOFF CONVERSATIONS

Goal-setting discussions with the Facilities Planning Committee emphasized the importance of Learning Forward Future Ready and how this initiative should influence changes made to existing buildings within the district. Additionally, six priorities were established as a baseline for improvements to all secondary schools' (priorities listed on opposite page).

The result of this exercise yielded a "why" as it relates to masterplanning efforts, that would serve as a common direction when engaging the various stakeholders for each school.

21ST CENTURY LEARNING ENVIRONMENTS

to give students more control of their learning

01

ACCOMMODATE STUDENT PRIVACY IN LOCKER ROOMS

to provide a space where all students feel comfortable

02

03

STRATEGIC MEP + SYSTEMS UPGRADES

to lessen the burden on deferred maintenance and capital outlay

ALL SECONDARY SCHOOL GOALS

ACCOMMODATE GROWTH

to satisfy a 2,000-student capacity at each high school

06

PROFESSIONAL SPACE FOR FACULTY COLLABORATION

to encourage healthy work culture and control of environment

05

04

SAFE AND SECURE CAMPUS

to adopt the safety standard already in place at the elementary and middle schools

HIGH SCHOOL SPECIFIC GOALS

“This is more than 1:1 and it’s more than just the device. This is about preparing our students with 21st century skills and strategies so they can compete globally. It’s about our schools being creative and resourceful and engaging students through meaningful and relevant learning...”

“We have an opportunity to level the playing field and close the digital divide. Our district is poised to create a learning culture and provide every student access to the tools necessary to foster their essential skill sets, support their creativity and inspire students to learn and achieve even more than we thought possible.”

-Kyle Hayden, Superintendent of Schools

Learning Forward, Future Ready

What does LFFR mean to you?
Is LFFR visible in your school?... Where does it happen?
What excites you about LFFR?
Where do you struggle to implement LFFR (related to your facility)?

Future Ready PLUS...

instances of personalized learning
special education
safety and security
circulation & wayfinding

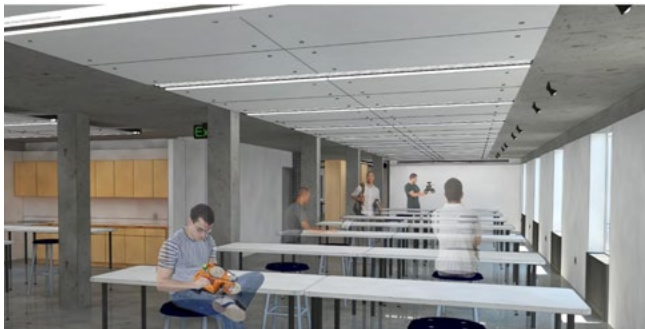
the “WHY”

creating a learning culture that supports students
having more control of their personalized learning,
including how and where they learn,
in order to optimize student engagement.

LEARNING EVERYWHERE

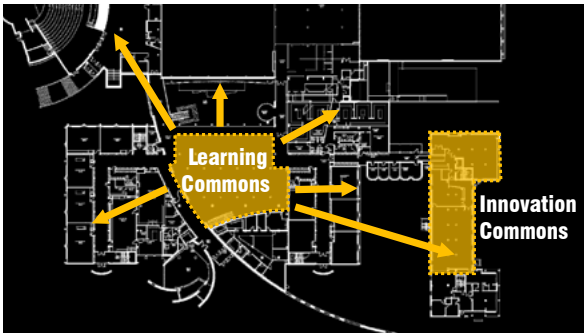
After the identification of goals and understanding why renovations were needed, the Facilities Planning Committee, along with the Lawrence High School steering committee, began a series of studies on what education spaces built within the last 5-10 years looked like and how they functioned. Schools from across the nation were discussed and all meeting groups identified what they liked and disliked about each space. The following pages are a summary of spaces that inspired these groups and what qualities were seen as most beneficial and applicable in the Lawrence School District.

Learning Everywhere was the most common and prominent theme throughout all precedents discussed. This idea that learning can and should exist outside the classroom is highlighted throughout these models and emphasized in all renovations and new additions at all Lawrence secondary schools.



PROJECT-BASED LEARNING

In Fall 2016, Rockhurst renovated their current building to provide a learning commons and makerspace for students to explore project-based learning. A major goal of this initiative is to encourage students to use the learning commons and makerspace — both while class is in session and after regular school hours — as a hub for working on projects. This facilitates collaboration between students and departments.



FACILITATE COLLABORATION



LEARNING COMMONS

High Tech High School
San Diego, CA



LEARNING ON DISPLAY

High Tech High Schools are a series of charters in California with a major emphasis on project-based learning and inter-departmental collaboration. Their buildings prioritize the display of student work, as well as transparent spaces, to highlight “learning on display.”



STUDENT COLLABORATION

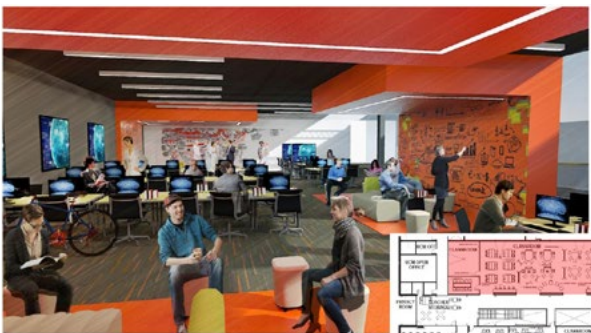


EXHIBIT STUDENT WORK



FLUID, TRANSPARENT BREAKOUT

MIC is a building in construction that will facilitate the Innovation program between Lee's Summit R-7 School District, Metropolitan Community College, and the University of Central Missouri. The building emphasizes transparency and transition between non-traditional classrooms and breakout spaces, with learning pockets supporting student collaboration and casual "pitching" of ideas. A valuable component to their learning spaces is providing individual, small-group and large-group study and meeting space.



HEADS-DOWN + GROUP STUDY



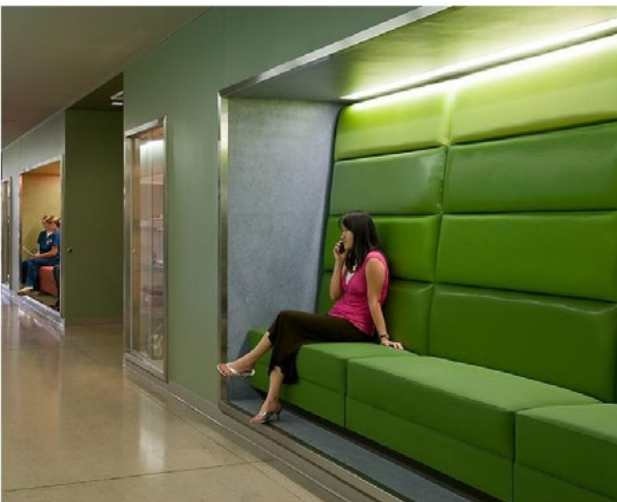
STUDENT PITCH SPACE

Breakout Spaces

Teachers and administrators of educational buildings constructed in the last 10 years report that breakout spaces outside the classroom are one of the most used and most valuable of 21st century learning spaces.



SOUTH MIDDLE SCHOOL
Lawrence, KS



**LIFE SCIENCE BUILDING
GLENDALE COMMUNITY COLLEGE**
Glendale, AZ



**ARRUPE HALL
ROCKHURST UNIVERSITY**
Kansas City, MO

Casual Seating, Focus Study Spaces Mixed

Additionally, a mix of breakout spaces with casual seating and heads-down study spots facilitate a variety of work groups and individual study preferences.



BLUE VALLEY ACADEMY HIGH SCHOOL
Overland Park, KS

Learning Pockets + Building Flexibility

Learning pockets throughout the building facilitate areas for students to gather and study before, during and after class. Additionally, the layering and transparency of program provides for optimum building flexibility.



MANHATTAN HIGH SCHOOL
Manhattan, KS

Transparent Spaces + Blurred Boundaries

Creating breakout spaces with transparency facilitates inter-departmental projects and collaboration. Additionally, from a functional standpoint, these spaces can be transformed and modified as best fits the learning style of the students and faculty.



**DUKE LINK
PERKINS LIBRARY**
Durham, NC

SUMMARY OF MEETINGS

Meetings were regularly scheduled throughout this process as a series of checkpoints for the design team to ensure all needs and concerns were being addressed. Most common were the Facilities Planning Committee meetings, which were held bi-weekly. These meetings provided a chance for the design team to report back to the committee on what designs were being created based on feedback from each school's Steering Committee.

Steering Committee meetings were also held regularly, and were a chance for the design team to hear first-hand, from school faculty and staff, the challenges and opportunities in supporting the established secondary schools masterplan goals.

06 USER GROUPS

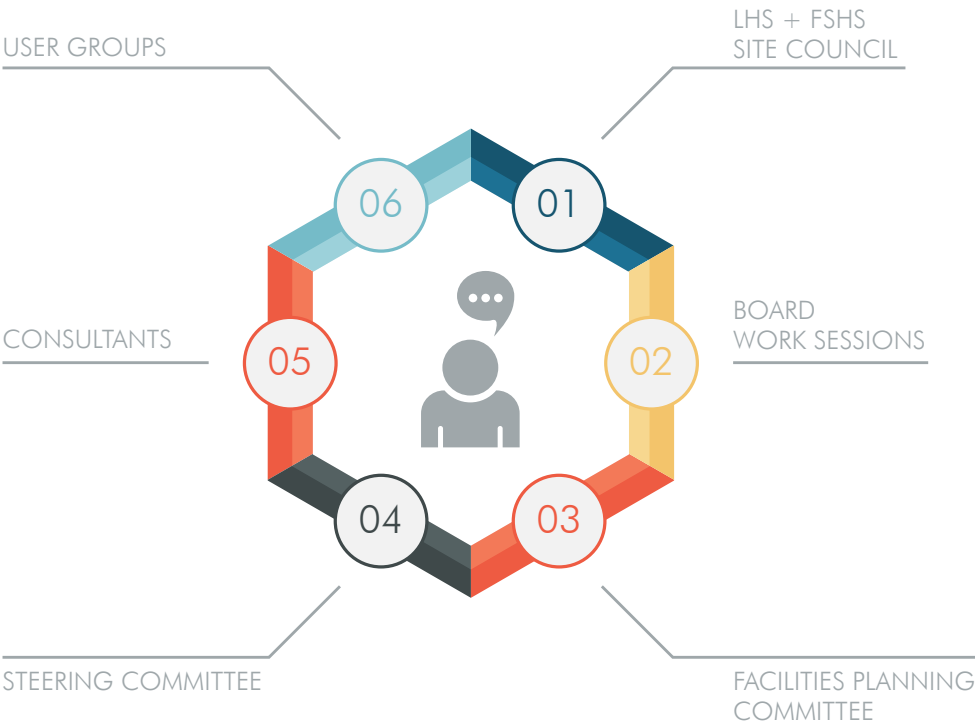
- 1. Administration
- 2. LHS Tech Ed
- 3. LHS Performing Arts
- 4. LGBTQ Representatives
- 5. LHS Food Service
- 6. High School Media
- 7. LHS Core Departments
- 8. High School Athletics

05 CONSULTANTS

- 1. HS MEP - Henderson Engineers
- 2. MS MEP - LST Engineers
- 3. LHS Pool and Natatorium Assessment - Water's Edge

04 STEERING COMMITTEE

This group, comprised of leaders within the school chosen by each school's principal, met with Gould Evans periodically to review proposed ideas and make recommendations to the facilities planning committee.



01 SITE COUNCIL

Gould Evans presented a set of proposed ideas to each school's Site Council to include feedback from the community into the secondary schools masterplanning process

02 BOARD WORK SESSIONS

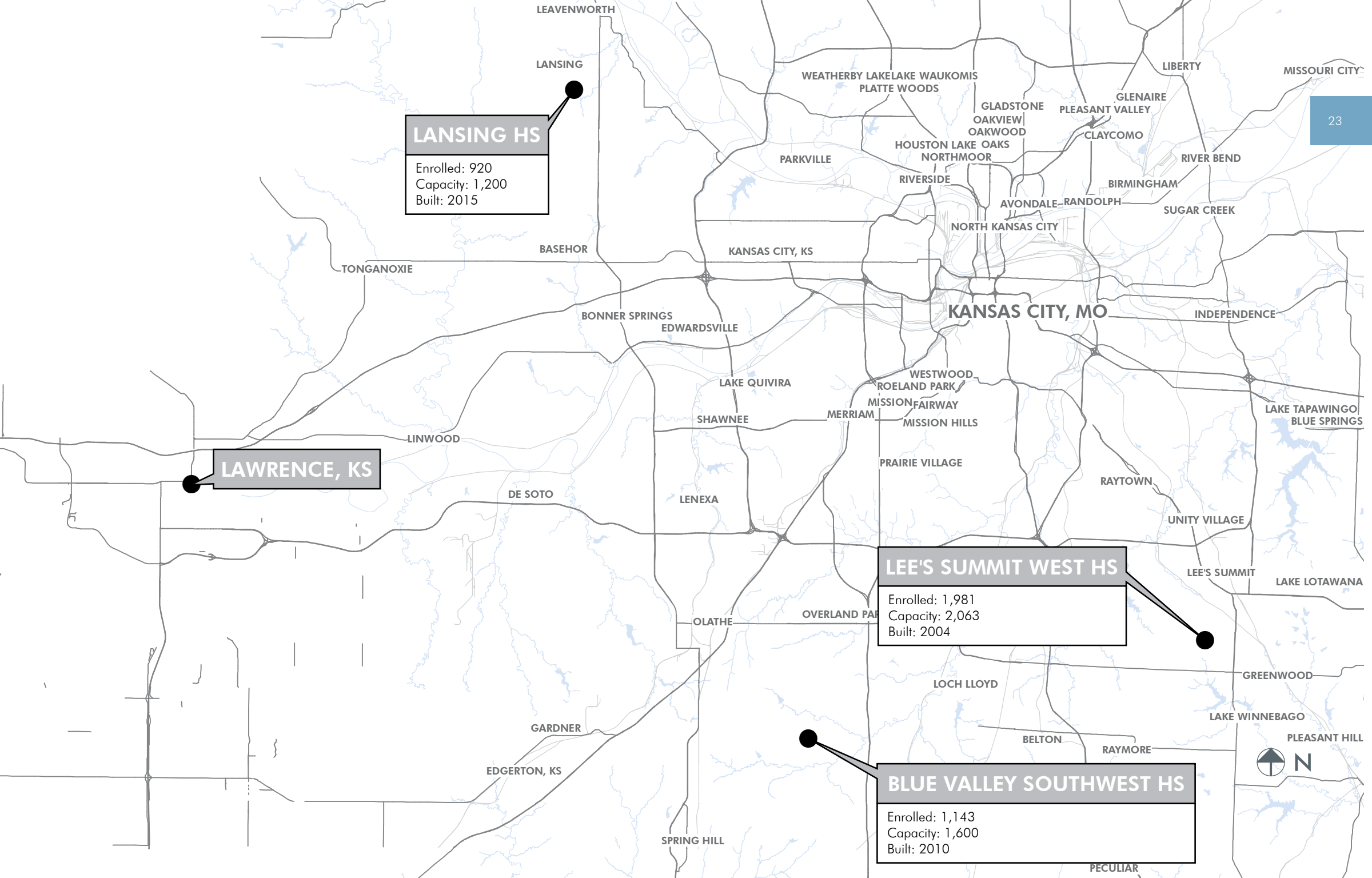
Gould Evans led one working session with secondary school administrators and all school board members to review masterplan goals and proposals.

03 FACILITIES PLANNING COMMITTEE

Gould Evans met bi-weekly with select school board members, the Superintendent and the facilities director for guidance and feedback.

REGIONAL BENCHMARKS

In May 2016, a group representing the Lawrence School District, administrators from each high school, and Gould Evans went on a tour of three schools in the Kansas City area. These public schools were all constructed in the last 10 years and have a student enrollment comparable to Lawrence and Free State High. Each school also has unique 21st century learning environments that provided the Lawrence School District the opportunity to observe in person before adopting and implementing similar practices in their own schools.



LANSING HS

Enrolled: 920
Capacity: 1,200
Built: 2015

LAWRENCE, KS

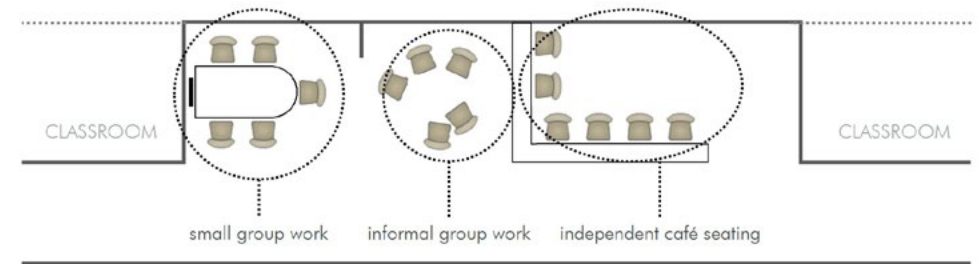
LEE'S SUMMIT WEST HS

Enrolled: 1,981
Capacity: 2,063
Built: 2004

BLUE VALLEY SOUTHWEST HS

Enrolled: 1,143
Capacity: 1,600
Built: 2010

Learning Outside the Classroom Corridor Breakout



LANSING HIGH SCHOOL LANSING, KS

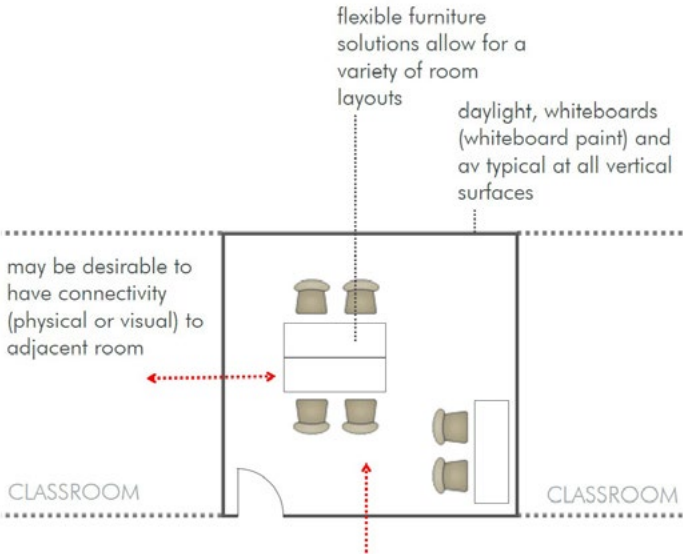
Corridor breakout provides a space for students to gather and work in small groups directly adjacent to their classroom, as well as a place to meet with friends before school or an alternative place to study and eat during lunch.

An important component to these spaces are multiple levels of digital support, including charging stations and screens to present and discuss material.



LEE'S SUMMIT WEST HIGH SCHOOL
LEE'S SUMMIT, MO

One enclosed breakout room for every 4-5 classrooms is becoming a common inclusion in new schools. These spaces are valuable for student groups of 5-6 meeting for extended periods of time. We have found that these spaces are used frequently during scheduled class time for group project collaboration.



GATHERING ADJACENT TO CLASSROOMS

The limitation to enclosed breakout is that the nature of students and faculty is to gather directly adjacent to their classrooms, even if they must sit on the floor as observed at Lansing High School, pictured above.

Exterior Learning Commons



LEE'S SUMMIT WEST HIGH SCHOOL
Lee's Summit, MO

Exterior learning commons are successful when they become destinations for social and educational gathering. Making courtyards a part of the common student and faculty pathways create an integral and meaningful use of the commons.

Additionally, a space for up to 30 people to gather during class time is a highly requested feature in outdoor school spaces.



BLUE VALLEY SOUTHWEST HS
Overland Park, KS

Providing seating for students to eat outside during lunch is another way to encourage use and purpose in the exterior learning spaces.



LANSING HIGH SCHOOL
Lansing, KS

Courtyards can be secured during school hours with a series of architectural gates to encourage visitors to use the front secured entry.



LEE'S SUMMIT WEST HIGH SCHOOL
Lee's Summit, MO

A large flex room was one of the most highly favored spaces by administrators on our benchmarking tours. The use of this room ranged from faculty meetings and professional development to student testing and multiple classes meeting for inter-departmental collaboration.



LANSING HIGH SCHOOL
Lansing, KS



Current Library vs. Library of the Future

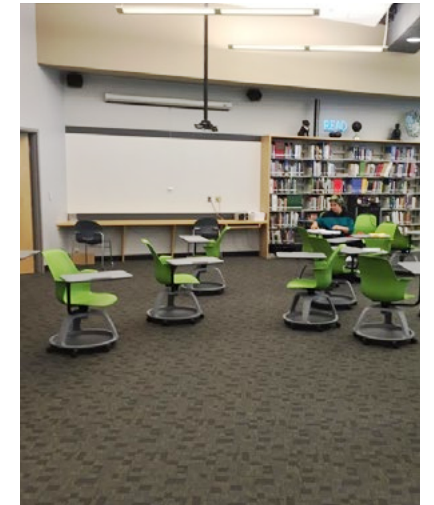
Until the implementation of 1:1 devices in schools, libraries were dominated by desktop computers (photo on left). When districts began to implement 1:1, this allowed space within the library to be freed up for more collaboration and heads-down study (photo on right), as well as maker spaces and digital production labs.



BLUE VALLEY SOUTHWEST HS
Overland Park, KS



LEE'S SUMMIT WEST HS
Lee's Summit, MO

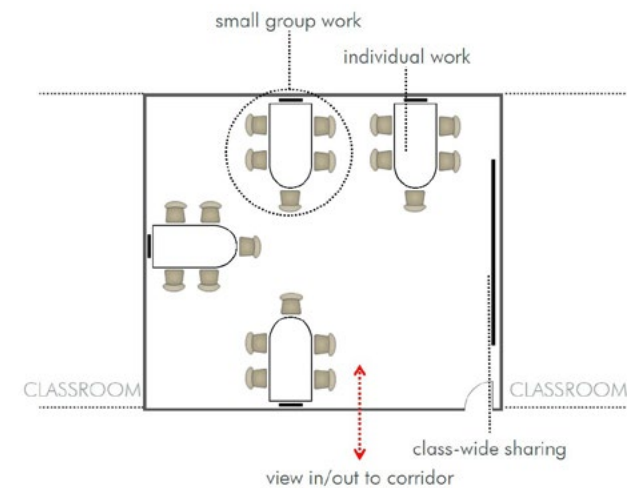
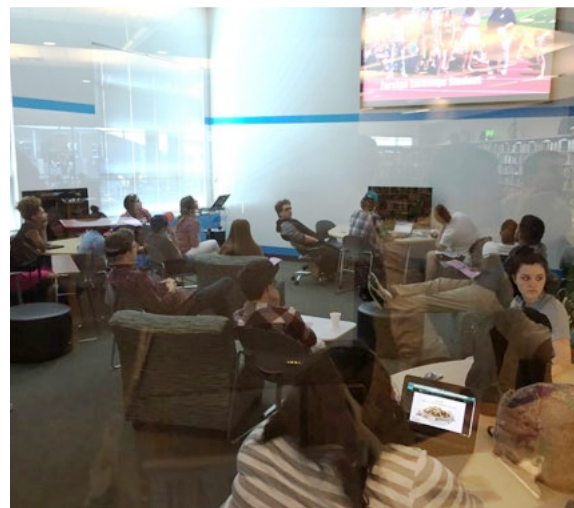


Student Access to Media

“Scale-up” rooms (pictured far right) allow students to work at three different scales: on their device, on a screen with a small group, or on a large projection to the entire room. Additionally, video editing studios equipped with green screens and sound equipment are skills being taught by more and more schools.



LEE'S SUMMIT WEST HS
Lee's Summit, MO



Faculty Department Breakout

21st century learning provides for a professional space for teachers, substitutes and paraprofessional educators to work outside the classroom and gather in groups to accommodate their entire department. Providing a place for planning outside the classroom frees up that classroom for floating teachers and the scheduling of rooms to be maximized.



LANSING HS
Lansing, KS



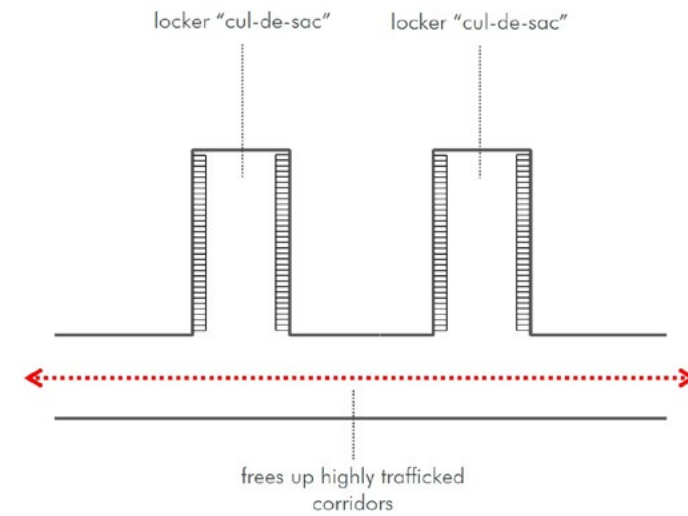
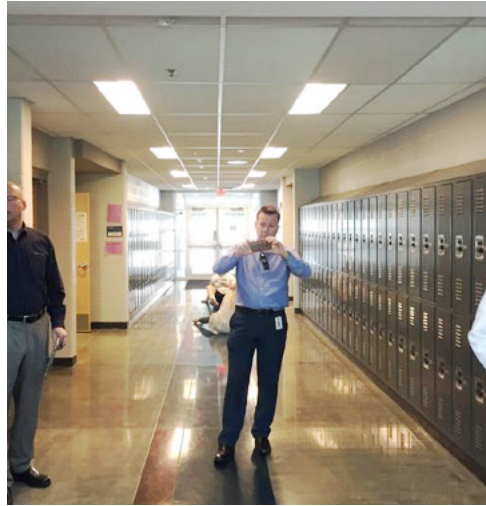
BLUE VALLEY SOUTHWEST HS
Overland Park, KS

Locker “Cul-de-Sac”

Removing lockers from primary corridors and placing them in secondary corridors frees up major trafficways and reduces cramped hallways during passing periods.

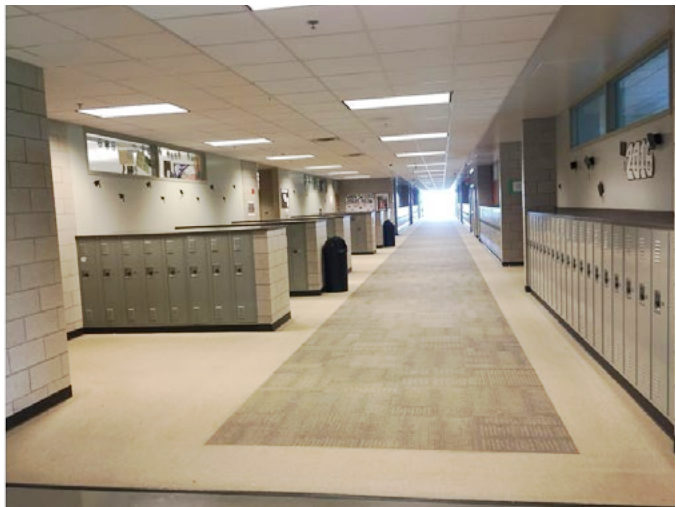


LEE'S SUMMIT WEST HS
Lee's Summit, MO

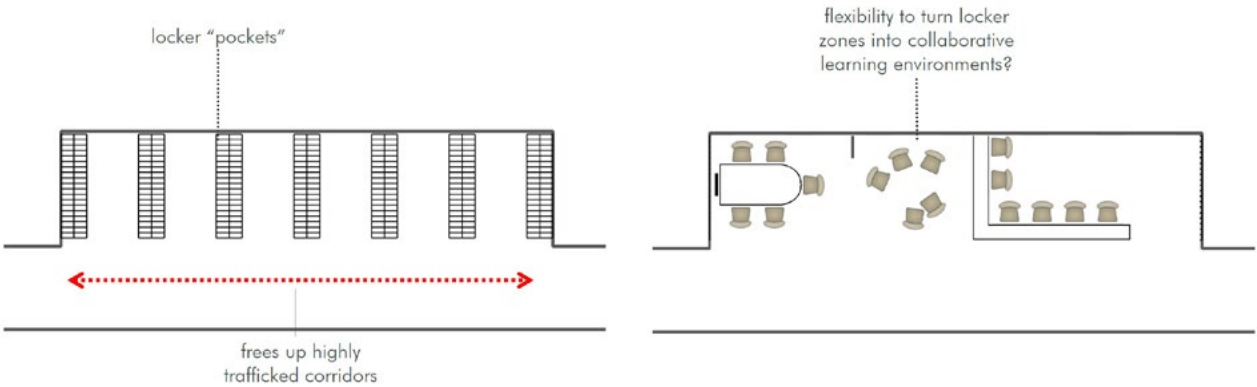


Locker Pockets

Locker pockets allow for lockers to be concentrated in a handful of locations throughout the school instead of scattered throughout every hallway. Additionally, if the district ever decides to remove lockers from their building, these pockets can be transformed into learning niches.



BLUE VALLEY SOUTHWEST HS
Overland Park, KS

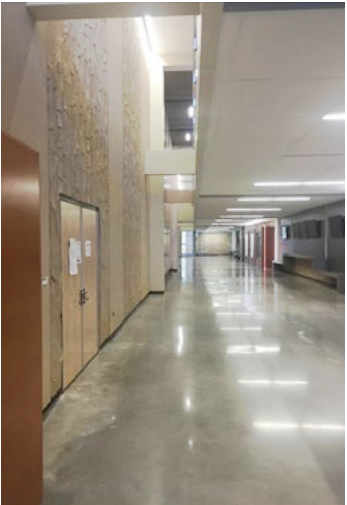


Zero Lockers

Lansing High School has opted to not have lockers anywhere in their building, except in the athletic/pe locker rooms. This creates more opportunity for learning pockets throughout the building and reduces traffic during passing periods. Instead, they provide a “touchdown zone” within classrooms for students to hang coats and keep small belongings throughout the day.



LANSING HS
Lansing, KS

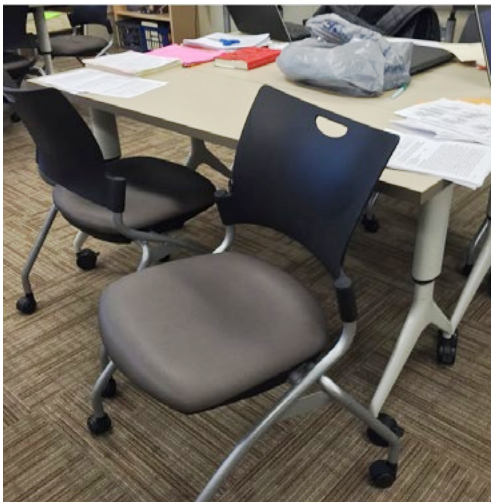


Classroom Furniture Flexible Options

Lansing tested out three models of furniture. Teachers and students both reported back that the most valuable furniture solutions to them were the most flexible and allowed teachers the fluidity to dictate the layout of their rooms.



LANSING HS
Lansing, KS



In particular, the narrow two-seater desks seemed to provide the most flexibility. We observed traditional lecture-style seating, “university” u-shaped seating, and pods of 4-8 people with these furniture solutions in classrooms throughout the school.

How 1:1 Influences a Building's Design

1:1 implementation has an effect on the building design on many levels, specifically: furniture and classroom size, student lockers, and library space. This requires less desk space than what was needed when students carried a book and notes for each of their classes.



LANSING HS
Lansing, KS

Lansing has completely omitted lockers from their building because students no longer carry textbooks from class to class. Instead, students have a place to hang coats and leave small items during class time, but teachers report that even these "touchdown" zones are not regularly used.



LEE'S SUMMIT WEST HS
Lee's Summit, MO

The teacher pictured above described to our group that her room is large enough, but the desks, which were standard size pre-1:1 implementation, are too big and take up too much room. This creates a classroom that is no longer flexible to facilitate small group meetings and breakout, and it makes the room feel much smaller than it actually is.



BLUE VALLEY SOUTHWEST HS
Overland Park, KS

Libraries no longer need a large dedicated space for desktop computers. The library no longer exists as a destination for access to technology, but is instead a fluid and collaborative zone that facilitates both heads-down and group study.

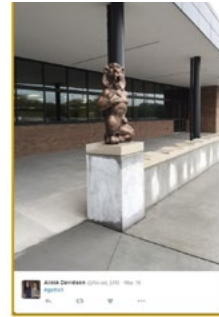
STUDENT SURVEYS

The last major piece of information to gather was the opinion of the students. Because Lawrence High had been identified in the beginning as the highest-need school, in terms of modernization and improvement of space, student surveys were only conducted at this school.

Students were distributed surveys during class time with a list of eight prompts which they could reply to via social media with a photo, a written response, or both. An email address was also provided to students as an anonymous submission outlet.

The responses gathered provided honest feedback from students about how they use their building on a daily basis and helped inform many design decisions throughout this process.

A Place that Captures the Spirit of LHS



SCHOOL MASCOT



AWARDS AND TROPHIES



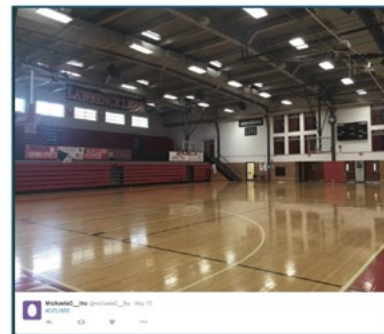
MAIN GYM



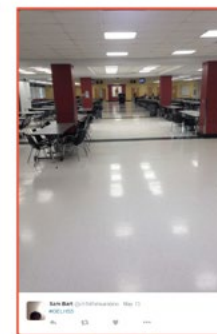
A Place You Meet Your Friends



CORRIDORS



MAIN GYM



CAFETERIA



A Study Space Outside a Classroom



LIBRARY



EXTERIOR COURTYARD



A Photo of the Inside of Your Locker



BOOKS / BINDERS



ITEMS OTHER THAN BOOKS



EMPTY



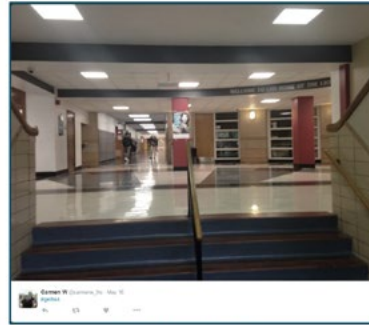
NO LOCKER



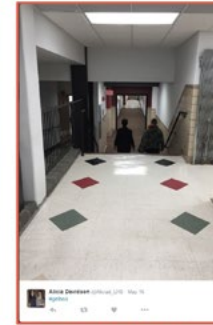
A Place Where You Feel Lost



WEST EXTERIOR COURTYARD



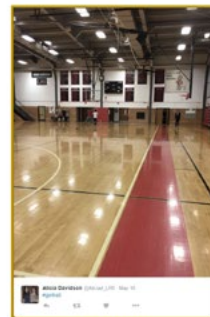
MAIN, EAST ENTRY



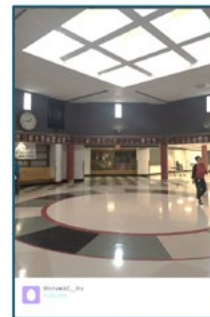
CORRIDOR TO TECH



A Place You Would Show a New Student / Visitor



MAIN GYM



MAIN ENTRY / ROTUNDA



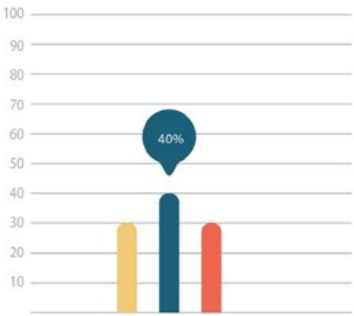
LATIN COURTYARD



MASCOT

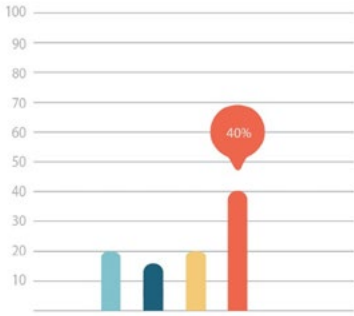


Student Surveys Compiled Results



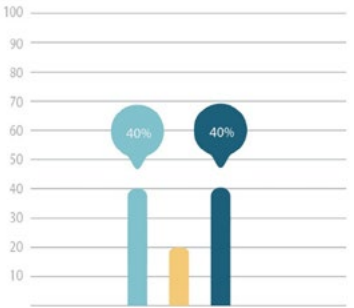
A place that captures the spirit of LHS?

1. Gym
2. Mascot
3. School awards / honors



Something / someplace you would show a new student/visitor?

1. Gym
2. Entry lobby / school awards / honors
3. Mascot (out front)
4. Exterior courtyard



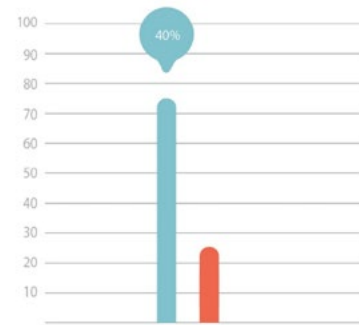
Where you meet your friends?

1. Entry to classroom
2. Gym
3. Cafeteria



A place where you feel lost?

1. Main, east entry
2. Level change to south wing
3. West, exterior plaza (between cafeteria and gym)



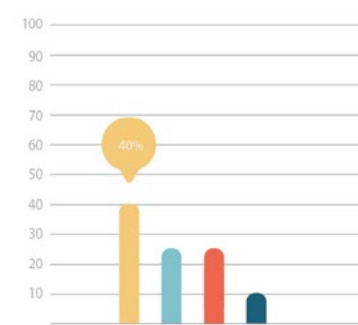
A place outside the classroom that you like to study?

1. Library
2. Exterior courtyard



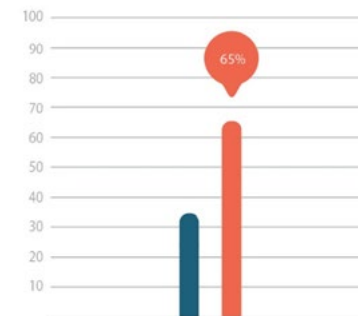
Where you keep your belongings while you're at school?

1. Book bag



The inside of your locker?

1. Books/binders
2. Food / food containers / water bottles
3. Empty
4. Does not have a locker



The stuff you carry throughout the day?

1. Phone
2. Book bag

EXISTING ANALYSIS

Understanding What Can Improve

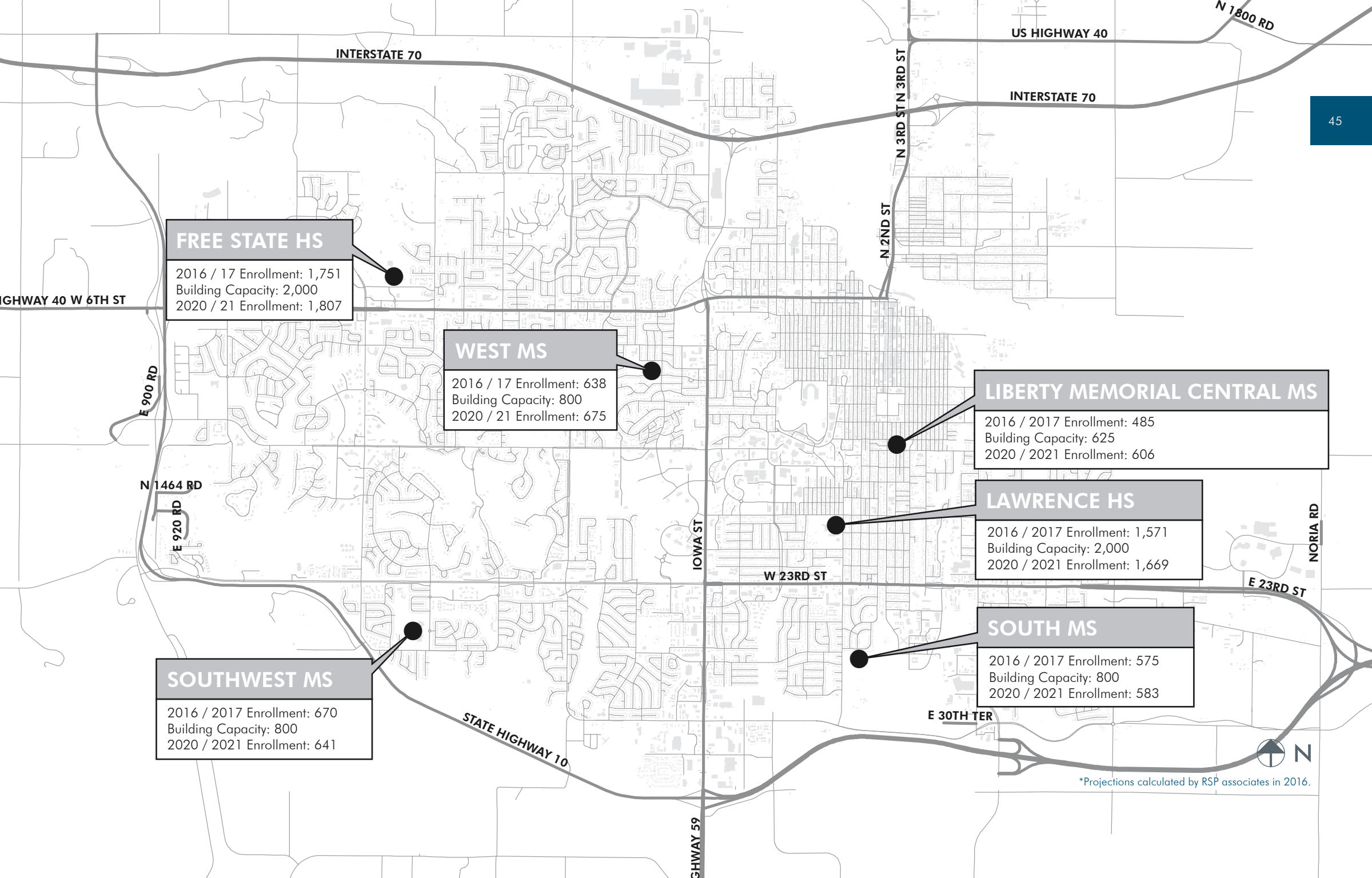
Studying the current buildings is an important process before creating a masterplan for renovations. Taking inventory of what each school has (and what they lack) is crucial to understanding how to address the problems that exist today.

In addition to outlining the specific needs identified at the middle and high schools, a major portion of this section is dedicated to understanding the classroom utilization at Lawrence and Free State High. The purpose of this study was to understand if each school needs a classroom addition to reach a capacity of 2,000 students.

CREATING DISTRICT-WIDE EQUITY

An underlying goal of this project is to bring all middle and high schools to an equal caliber.

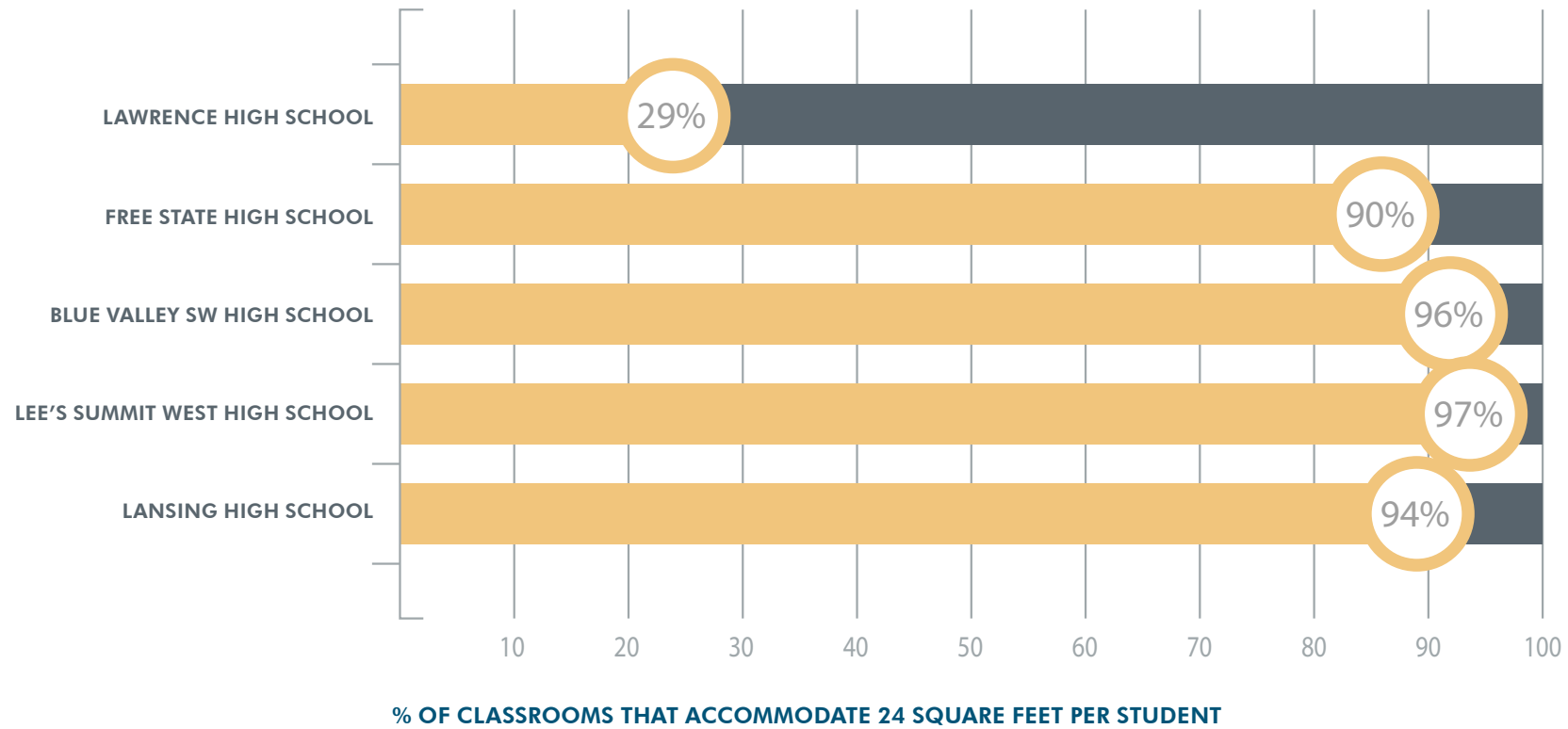
This analysis took the form of many studies ranging from classroom size and number of classrooms to athletics spaces to locker room and restroom improvements.



Classroom Size Comparison

	LAWRENCE HS		FREE STATE HS		BLUE VALLEY SW HS		LEE'S SUMMIT WEST HS		LANSING HS	
	SF	SF/STUDENT	SF	SF/STUDENT	SF	SF/STUDENT	SF	SF/STUDENT	SF	SF/STUDENT
	384	---	607	20	620	21	603	21	653	21
	394	---	624	21	702	23	614	22	653	21
	433	---	634	21	705	24	627	22	671	22
	473	---	640	21	713	24	627	22	671	22
	476	---	666	22	720	24	653	23	673	22
	480	---	684	23	729	24	661	23	673	22
	487	---	695	23	737	24	668	23	678	22
	507	---	699	23	738	25	673	23	679	22
	510	---	705	24	756	25	682	24	683	22
	519	---	706	24	760	25	700	24	683	22
	527	---	710	24	762	25	705	24	686	22
	531	---	711	24	764	25	707	24	686	22
	544	18	711	24	772	26	709	24	699	23
	548	18	711	24	782	26	715	24	706	23
	554	18	711	24	785	26	716	24	718	23
	562	19	711	24	807	27	720	25	720	23
	567	19	711	24	810	27	729	25	733	24
	572	19	711	24	815	27	736	25	742	24
	572	19	711	24	823	27	739	25	753	24
	577	19	711	24	851	28	752	26	756	24
	579	19	711	24	864	28	754	26	757	24
	586	20	711	24	881	29	755	26	763	25
	587	20	711	24	968	32	758	26	770	25
	595	20	711	24	1017	34	759	26	771	25
	598	20	712	24	1035	35	761	26	780	25
	600	20	712	24	1074	36	762	26	784	25
	604	20	712	24	1267	42	769	27	784	25
	614	20	712	24			776	27	796	26
	640	21	712	24			785	27	796	26
% OF CORE CRs ≥ 24 SF / STUDENT	646	21	712	24			794	27	796	26
	661	22	712	24			806	28	807	26
	712	24	712	24			807	28	833	27
	724	24	716	24			811	28	844	27
	754	25	721	24			812	28		
	768	26	728	24			820	28		
	786	27	728	24			832	29		
	788	27	730	24			858	30		
	809	28	748	25			868	30		
	863	30	835	28			890	31		
	909	30	965	32						
	1067	36	988	33						
	1098	37								
MAX. STUDENTS / CR	30 (assumed)		30 (assumed)		30		29		31	

CLASSROOMS THAT ACCOMMODATE 24 SQUARE FEET PER STUDENT



Growth Accommodation: Classroom Utilization

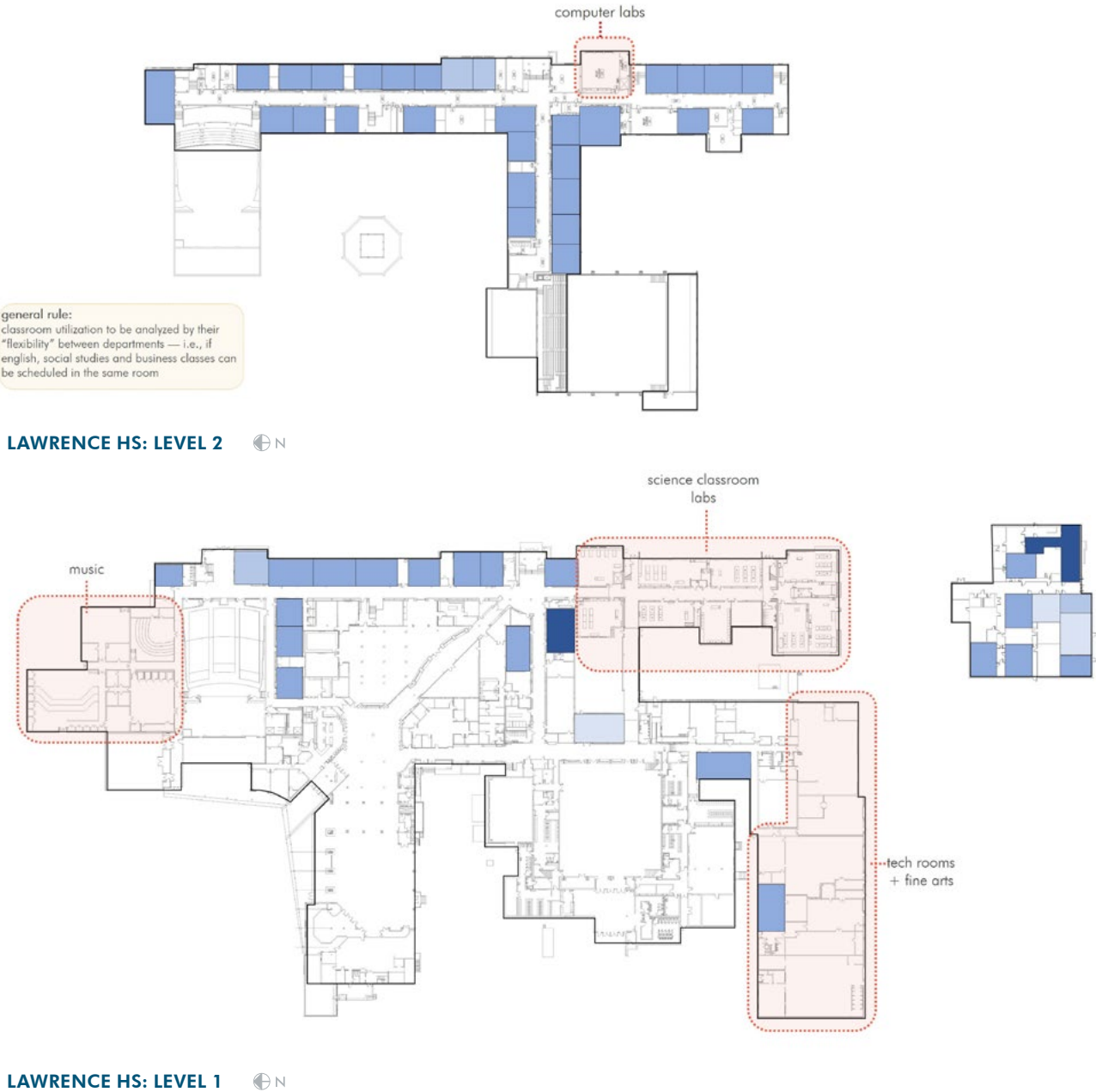
A major component of this process was understanding where each school would be in 5, 10, and 20 years. Attendance is projected to steadily increase, and in five years both high schools will be close to reaching capacity.

We received many comments about buildings currently feeling too small. There are a number of factors that go into this feeling of overcrowding, and one major factor is how each classroom is scheduled.

There are seven class periods in a day. Traditionally, full-time teachers host a class for six periods and have one period to plan. When a building is under capacity teachers can “own” their classrooms — that is, they can plan in the classroom they teach in because the space is not needed for a class during his or her plan period. However when a building is at or over capacity, every classroom must be used for every period. In this scenario the teacher would leave their classroom to plan in a faculty work room, while another teacher hosts a scheduled class in that room. Understanding how classrooms are scheduled and maximized is called Classroom Utilization, and it helps us understand if the school could use additional classroom space.

In addition to scheduling factors, LHS feels cramped because the classroom sizes are smaller than average

- Used 7 periods – 100% utilization
- Used 6 periods – 86% utilization
- Used 5 periods – 71% utilization
- Used 3 periods – 43% utilization



WE ANALYZED 56 “NORMALIZED” CLASSROOMS

If each normalized classroom was scheduled for 7 periods a day, this equates to 392 class periods per day & 100% utilization.

	classrooms	%	periods
7 periods	2	4%	14
6 periods	47	84%	282
5 periods	4	7%	20
4 periods	0	0%	0
3 periods	3	5%	9
TOTAL:	56	100%	325

LAWRENCE HIGH UTILIZATION RESULTS

Lawrence High School has a classroom utilization percentage at 83%, when classrooms are right-sized to accommodate 30 students per classroom. The majority of their classrooms are only scheduled for 6 periods a day.

Proposed is an addition of 2 classrooms, which will bring the current utilization of the school down to 80%. Like Free State, this provides scheduling flexibility for classrooms and the ability to grow to 2,000 students.

$325 / 392 = 83\%$

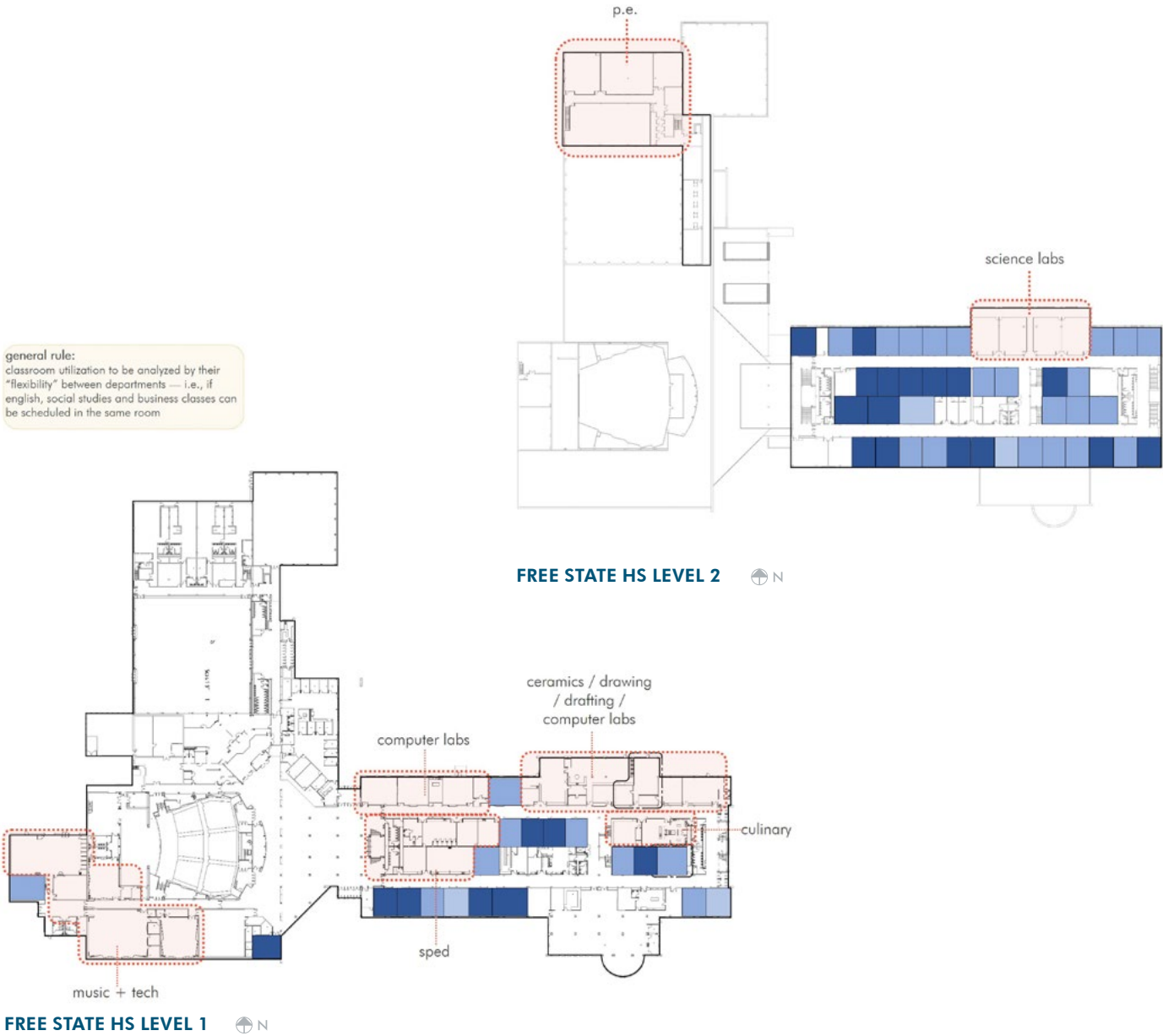
with the addition of 2 normalized cr's:

$325 / 406 = 80\%$

Growth Accommodation:
Classroom Utilization

general rule:
classroom utilization to be analyzed by their
"flexibility" between departments — i.e., if
english, social studies and business classes can
be scheduled in the same room

- Used 7 periods – 100% utilization
- Used 6 periods – 86% utilization
- Used 5 periods – 71% utilization
- Used 3 periods – 43% utilization



WE ANALYZED 57 “NORMALIZED” CLASSROOMS

If each normalized classroom was scheduled for 7 periods a day, this equates to 399 class periods per day & 100% utilization.

	classrooms	%	periods
7 periods	24	42%	168
6 periods	29	51%	174
5 periods	4	7%	20
4 periods	0	0%	0
3 periods	0	0%	0
TOTAL:	57	100%	362

FREE STATE UTILIZATION RESULTS

Free State High School currently has a high percentage of classroom utilization at 91%. What this tells us is that 42% of classrooms are used every period of the day, and that these classrooms are shared throughout the day by at least 2 teachers. To reach a capacity of 2,000 students, Free State will need to have a classroom utilization of 100%, which realistically is not possible.

Proposed is an addition of 7 classrooms, which will bring the current utilization of the school down to 81%. This provides scheduling flexibility for classrooms and the ability to grow to 2,000 students.

362 / 399 = 91%

with the addition of 7 normalized cr’s:

362 / 455 = 81%

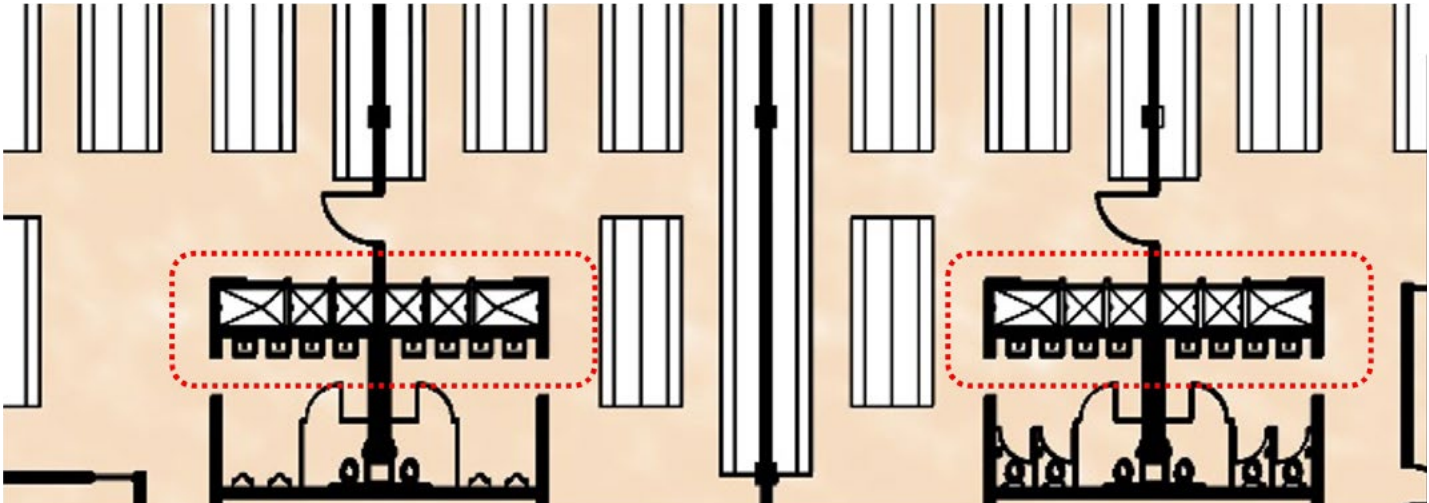
Individual Showers, Changing Stalls

In secondary schools across the school district, locker rooms are equipped with “gang,” or group, showers. Many students are uncomfortable showering in front of their peers, and because of this, these showers are underutilized.



**EXISTING LHS
LOCKER ROOM SHOWERS**

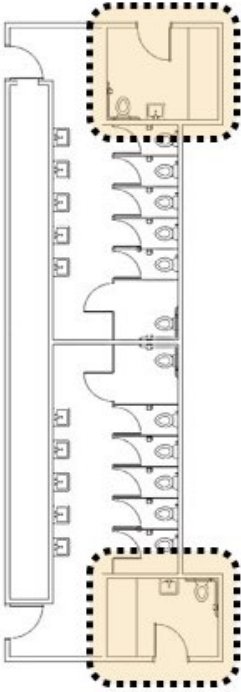
Replacing gang showers with individual shower stalls would provide the option for students to both change and shower in private.



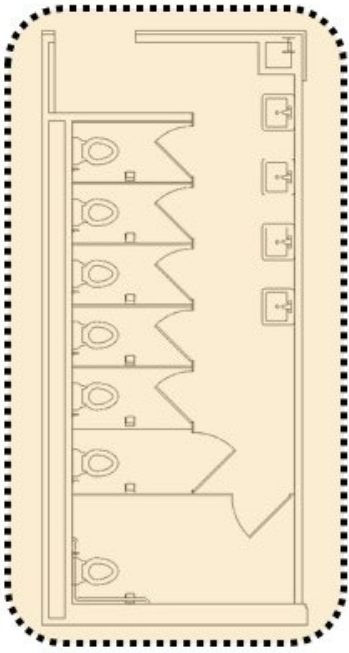
**PROPOSED INDIVIDUAL STALLS
AT FREE STATE HIGH SCHOOL**

Gender-Neutral Restroom Configurations

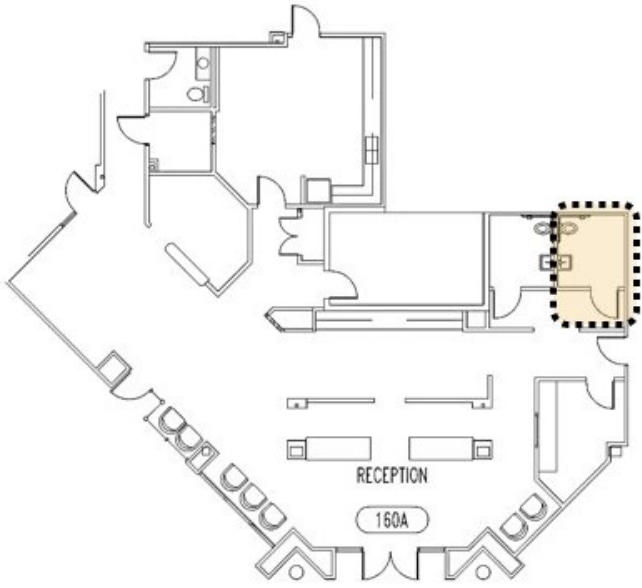
Multiple configurations of a gender-neutral restroom solution were explored and discussed with LGBTQIA leaders within the school district. This is an ongoing discussion, as they (and the nation as a whole) do not think a perfect solution yet exists.



OPTION A
Non-gender specific individual restrooms located off the corridor and separate from gendered restrooms. Can cause a stigma around those wishing to use the individual restroom.



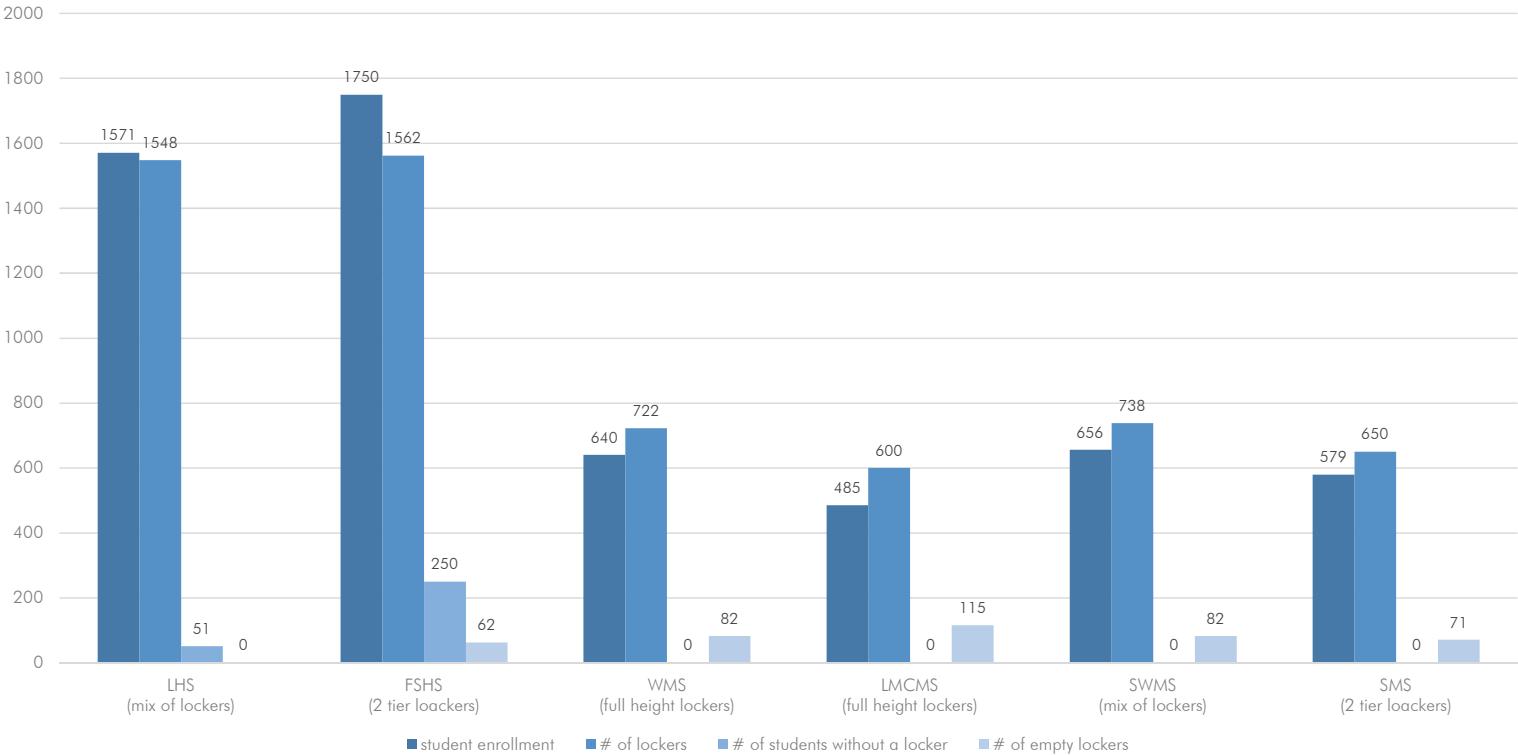
OPTION B
All restrooms in building are gender-neutral and are equipped with individual enclosed stalls and shared sink space. Can be difficult to supervise.



OPTION C
Gender-neutral restroom located within the admin core provides ambiguity for student visiting the restroom. Can cause a stigma around those wishing to use the individual restroom.

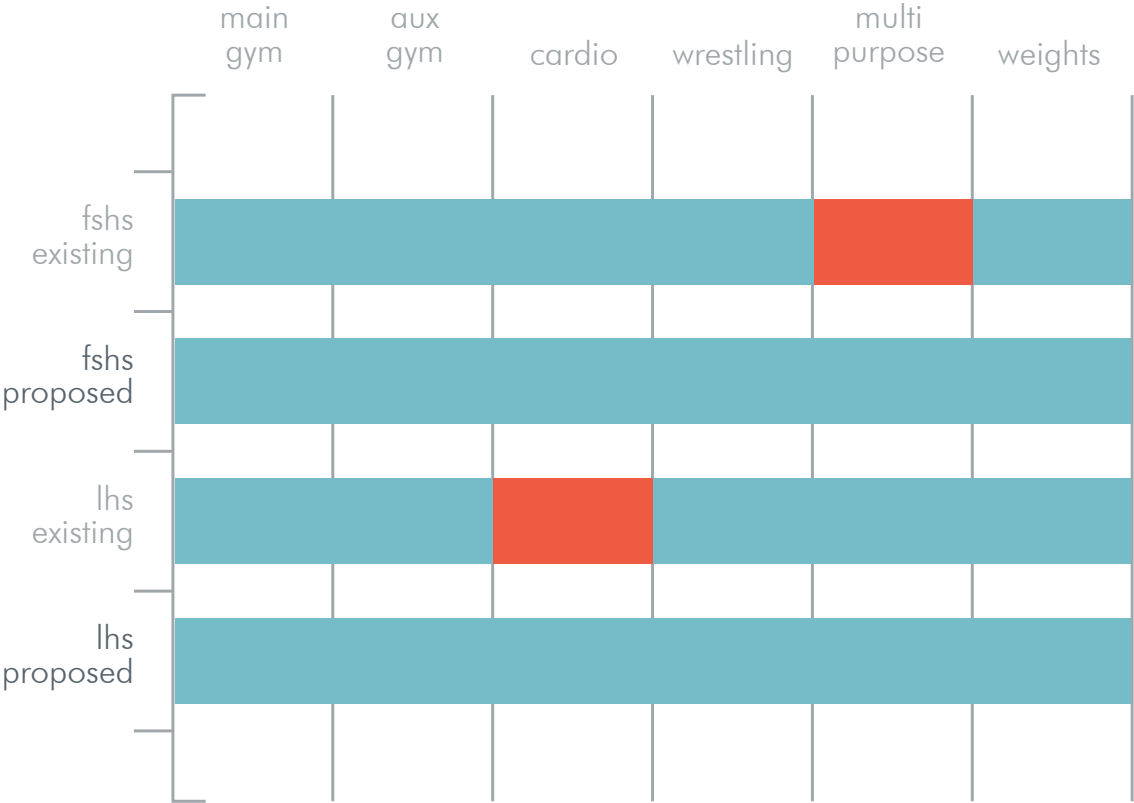
Existing Locker Analysis

Lawrence Secondary Schools are approaching capacity for their currently available lockers. This masterplan proposes full height lockers be renovated to two-tier lockers to accomodate enrollment growth and allow space in corridors to create “learning pockets.”

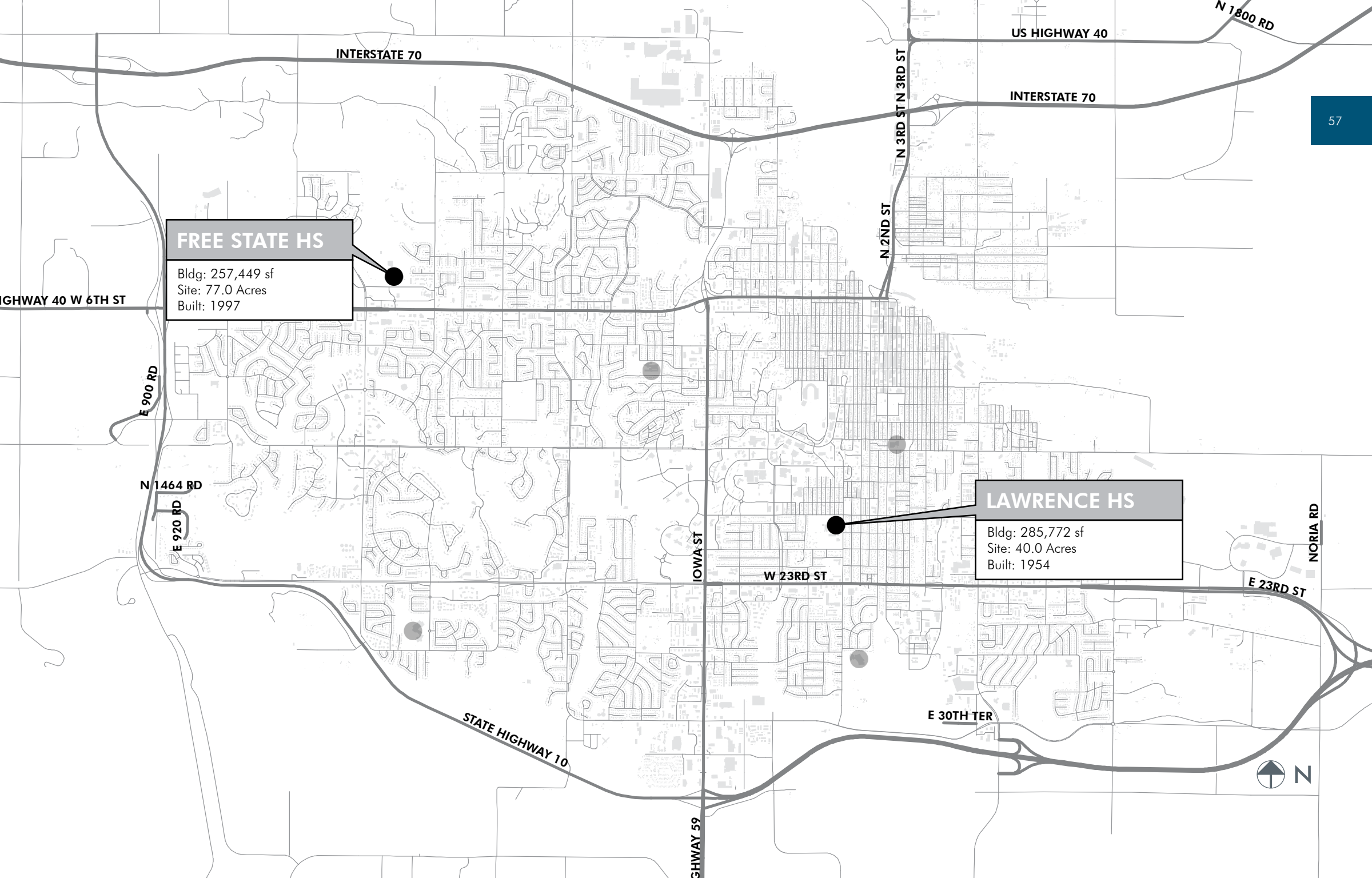


Athletics Spaces

An inventory of athletics spaces was taken at both high schools, and a few disparities were discovered. In the proposed masterplan both high schools will have the same amount of athletics spaces.



HIGH SCHOOL NEEDS



FREE STATE HS

Bldg: 257,449 sf
Site: 77.0 Acres
Built: 1997

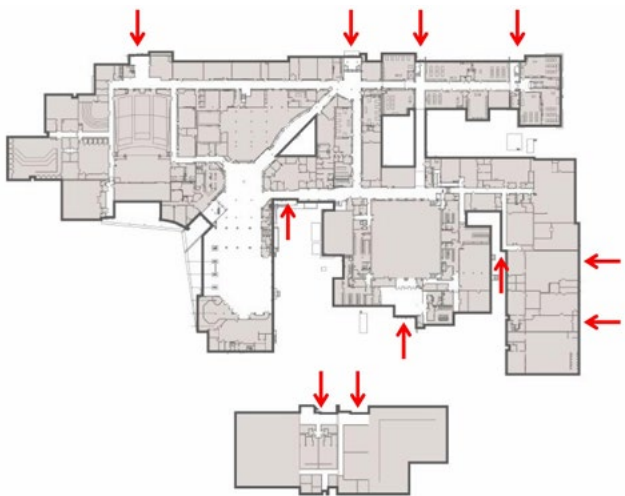
LAWRENCE HS

Bldg: 285,772 sf
Site: 40.0 Acres
Built: 1954



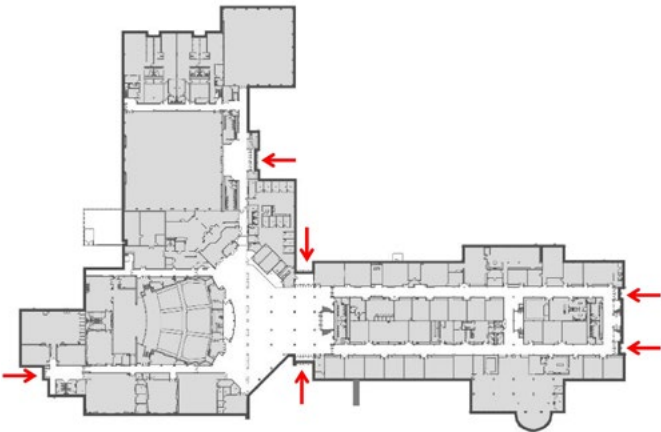
LAWRENCE HIGH SCHOOL

- Create a secure campus that supports the secure entry lobby constructed in previous bond effort



LAWRENCE HIGH SCHOOL

Many unsecured points of entry (indicated by red arrows) can create a potentially unsafe environment for students.



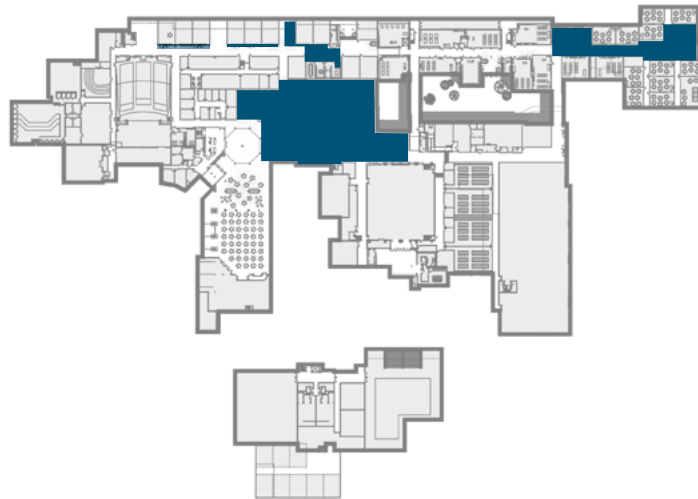
FREE STATE HIGH SCHOOL

Limiting points of entry and monitoring their activity improves campus security.



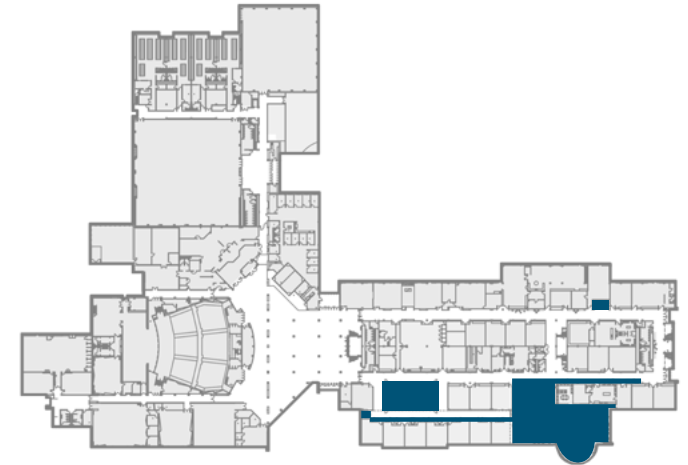
LAWRENCE / FREE STATE HS

- Create collaborative *Learning Pockets* along corridors, supporting in-class breakout
- Transform library/media centers into a flexible modern media center, with support for maker space, project-based learning, and in-class breakout



LAWRENCE HIGH SCHOOL

Proposed breakout and commons



FREE STATE HIGH SCHOOL

Proposed breakout and commons

Accommodate Growth

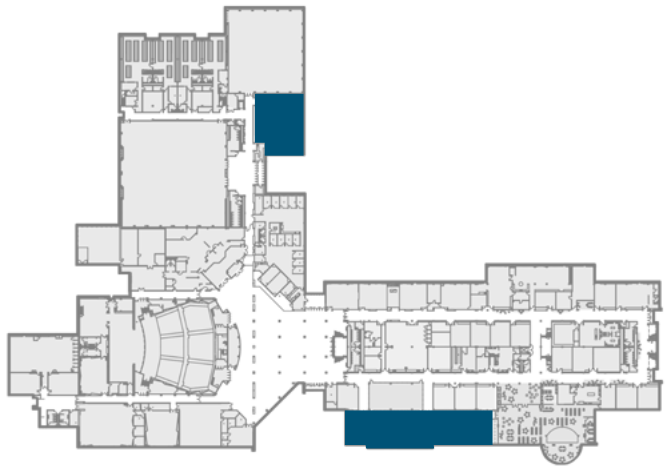
LAWRENCE / FREE STATE HS

- Provide additional classroom capacity to accommodate classroom needs projected over the next 5-10 years



LAWRENCE HIGH SCHOOL

- (2) additional general classrooms



FREE STATE HIGH SCHOOL

- (7) additional general classrooms

Professional Space for Faculty + Separate Flex Space

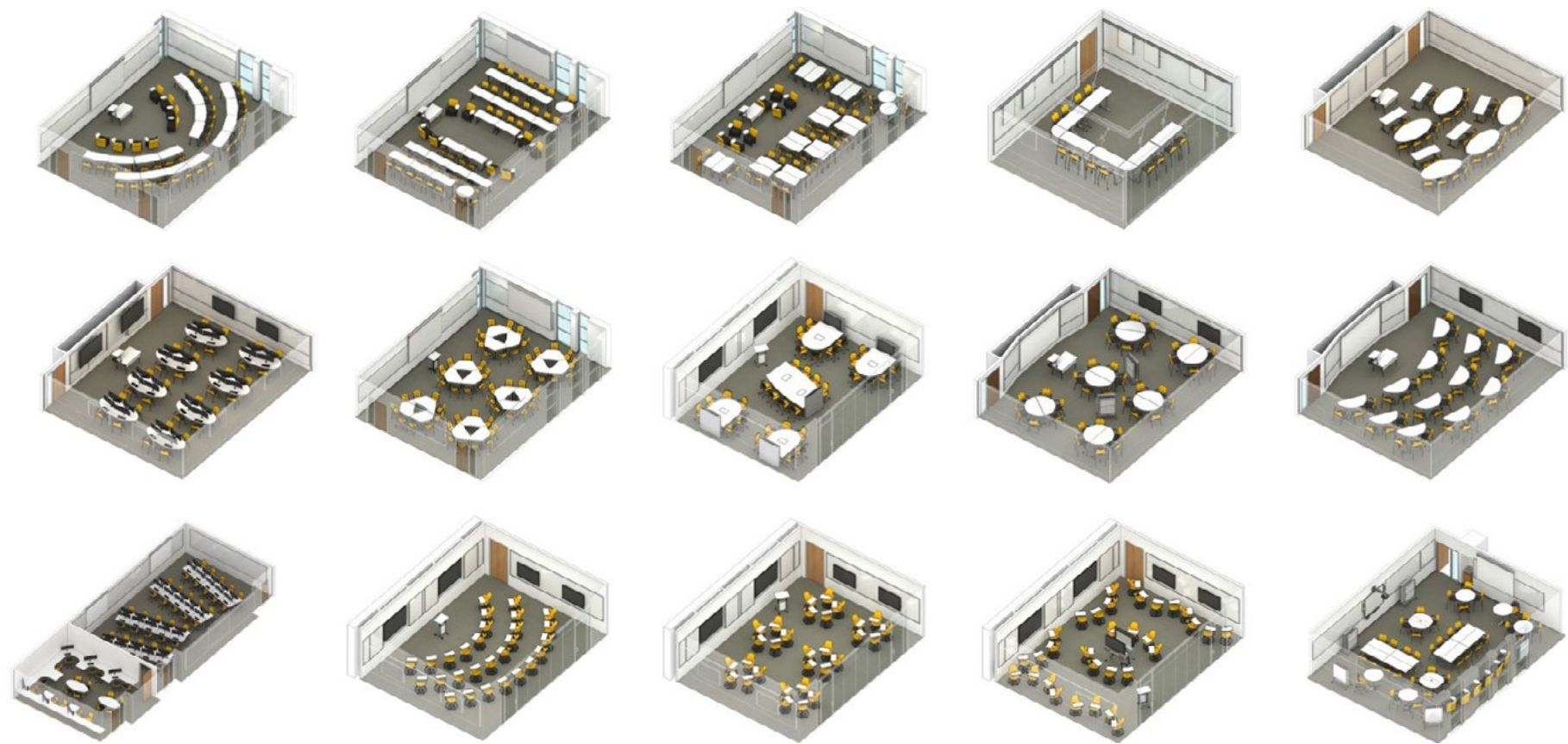


LAWRENCE / FREE STATE HS

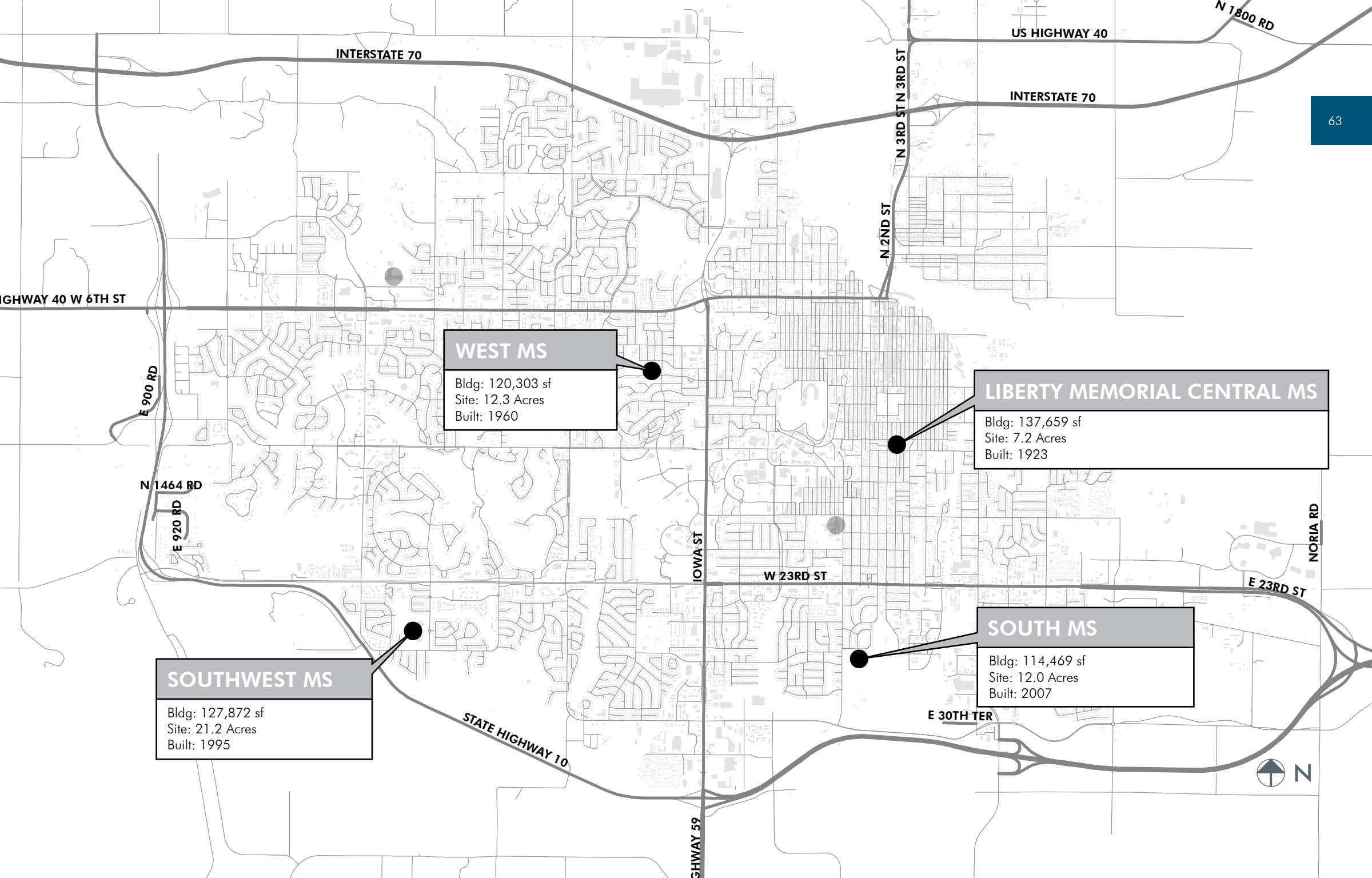
- Provide professional space for faculty to create lesson plans *outside* of the classroom, freeing up general classroom space for formal instruction. This space is intended for use as a hot desk for floating faculty.
- Incorporate flex room to accommodate 60-80 students at tables or 150 in rows. Space may be used for testing, all-faculty meetings, and multi-class collaboration.

Standard Classroom Size, Flexible Layout

Through this planning, the district established a new standard of 720 sf for general high school classrooms, accommodating 30 students at 24 gsf/student. Room size and proportions are designed to accommodate a variety of furniture solutions and teaching methodologies, spanning lecture to team-based active learning.



MIDDLE SCHOOL NEEDS



Learning Everywhere



ALL MIDDLE SCHOOLS

- Create collaborative *Learning Pockets* along corridors, supporting in-class breakout
- Transform library/media centers into flexible modern media centers, with support for maker space, project-based learning, and in-class breakout

WEST MIDDLE SCHOOL

- Right-size classrooms
- New HVAC system



ALL MIDDLE SCHOOLS

- Single-occupancy showers and single-occupancy changing stalls needed in locker room to provide optional privacy for all students

PROPOSED MASTERPLAN

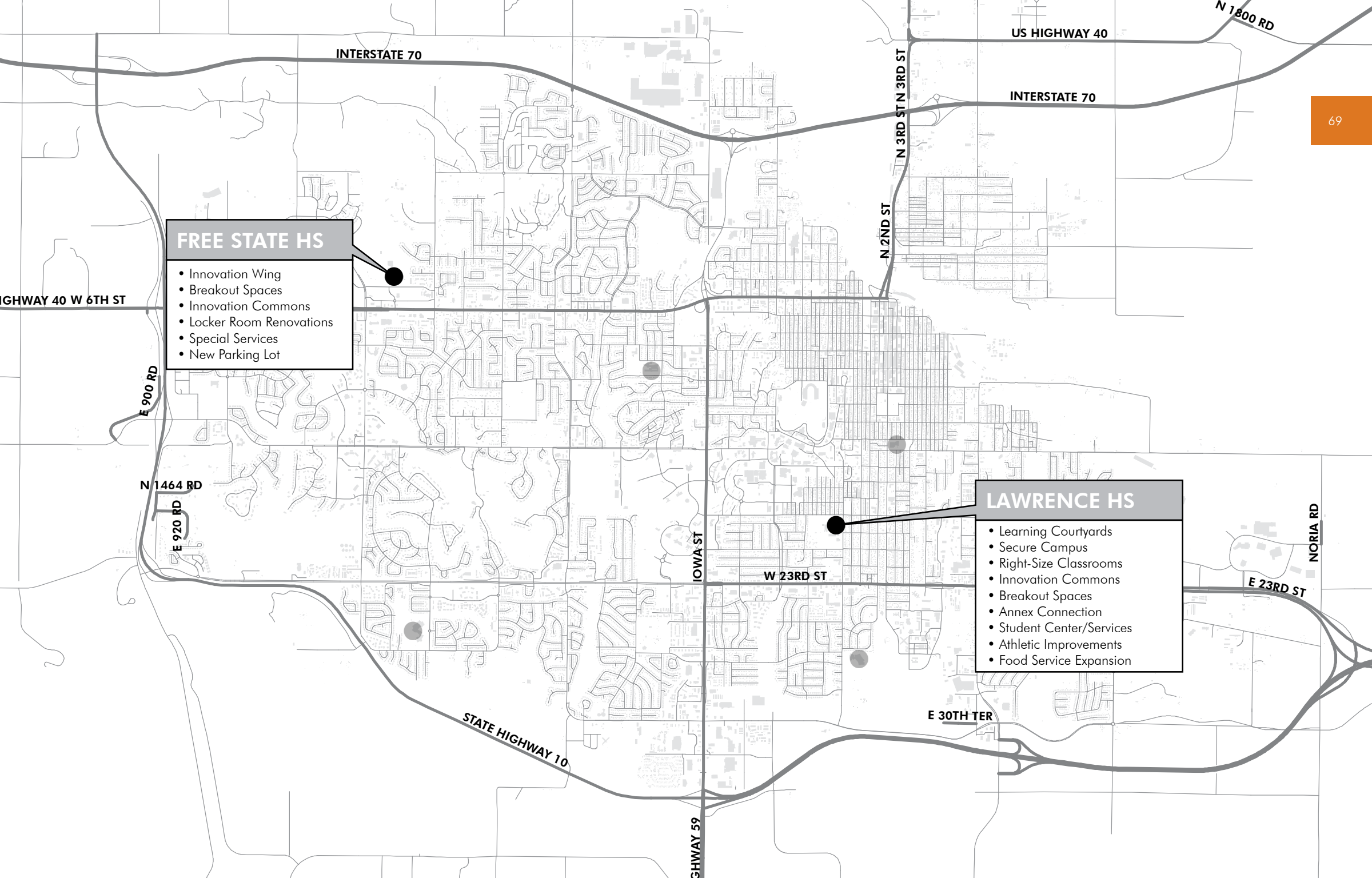
A MASTERPLAN FOR LAWRENCE HIGH SCHOOLS

The identified needs at the high schools includes the implementation of 21st century learning (learning everywhere), creating a safe and secure campus, providing a professional space for faculty to meet and work outside the classroom, a large flex room to hold 100+ people, and accommodate for additional growth up to 2,000 students.

The extent of renovation at Lawrence and Free State High looks very different. Lawrence High is almost 60 years old, and has been added to and renovated numerous times, resulting in a building that is no longer cohesive or easy to navigate. Free State HS, however, was built within the last 20 years, and though it was originally designed with the goals of 21st century learning in mind, it would benefit from the modifications proposed in the masterplan.

The end goal at both high schools is to provide modern spaces where students can easily collaborate both inside and outside the classroom. This comes in the form of corridor breakout, enclosed breakout rooms, and a modernized library and media center.

An additional goal at Lawrence High School is the creation of larger classrooms to bring the square footage of each classroom to a comparable size to Free State and the other regional benchmark schools.



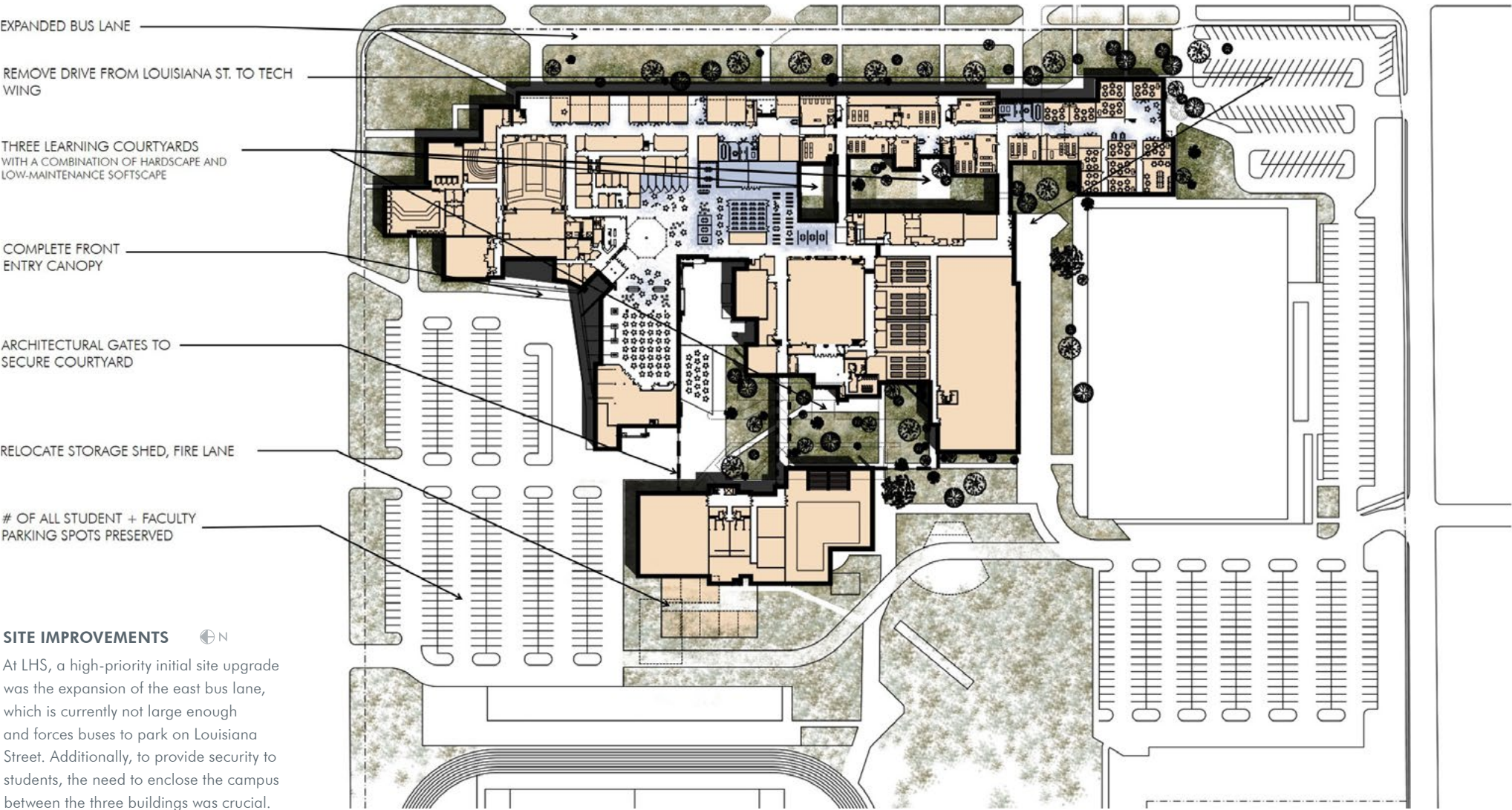
FREE STATE HS

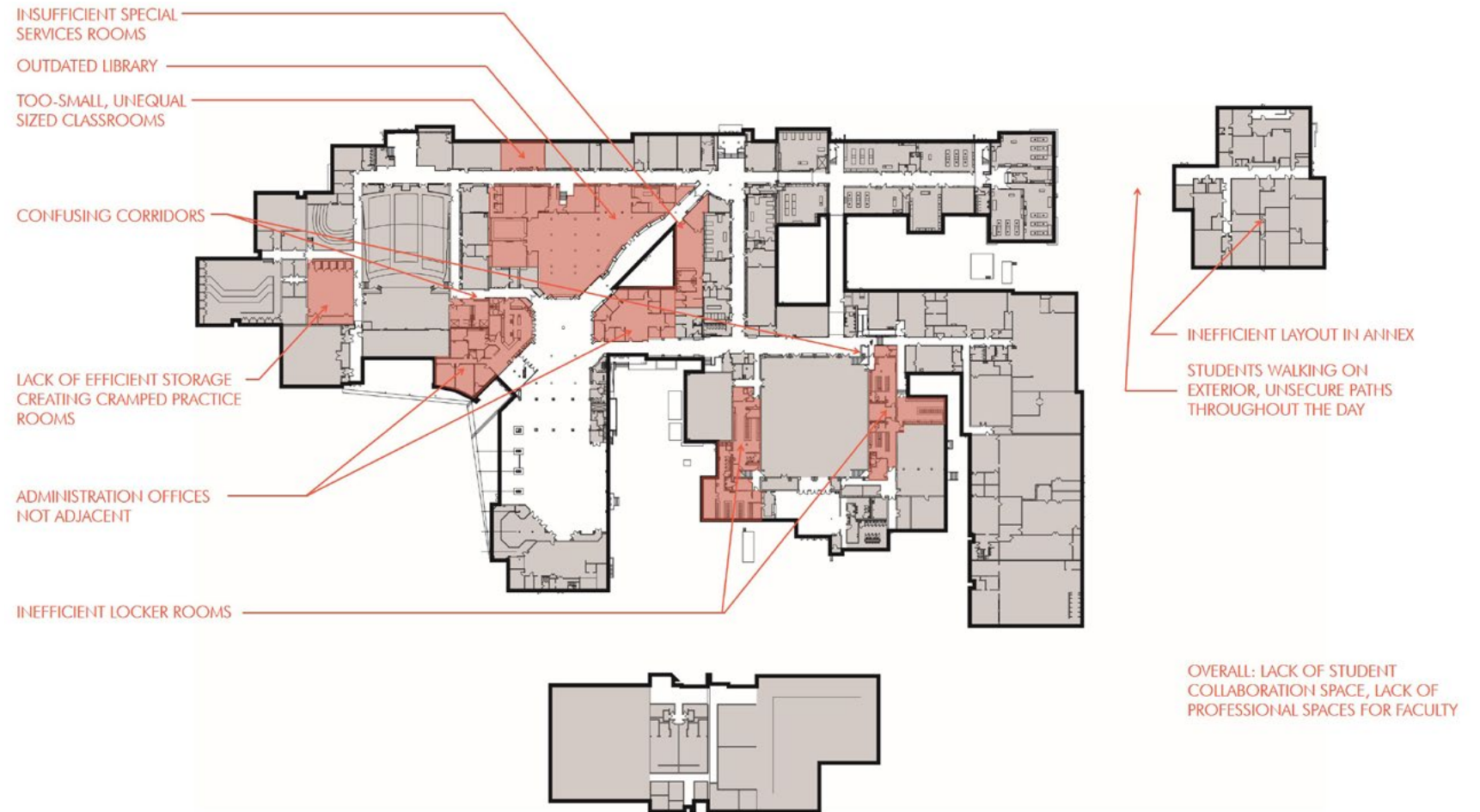
- Innovation Wing
- Breakout Spaces
- Innovation Commons
- Locker Room Renovations
- Special Services
- New Parking Lot

LAWRENCE HS

- Learning Courtyards
- Secure Campus
- Right-Size Classrooms
- Innovation Commons
- Breakout Spaces
- Annex Connection
- Student Center/Services
- Athletic Improvements
- Food Service Expansion

Lawrence High School





Lawrence High School

The primary driver for interior renovation at LHS was the right-sizing of classroom space
This initiates renovation through all core classroom corridors.

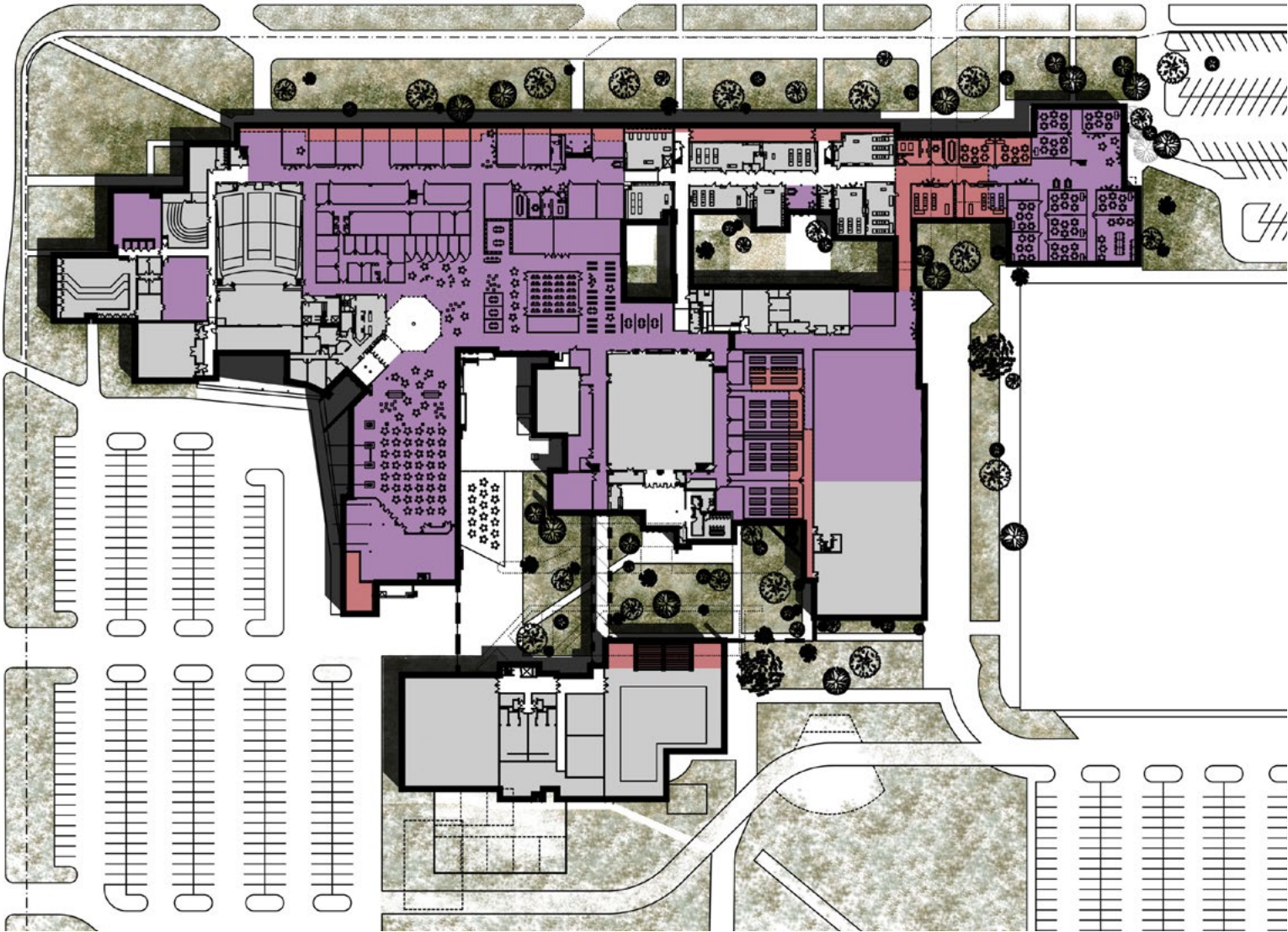
Additionally, through our student surveys we found that wayfinding and circulation through the building was confusing and overwhelming
To improve wayfinding the gutting of the “heart” of the building where the library, some administration offices, and a handful of classrooms were located would open the building and realign a more consistent grid of corridors.

A total gut of the annex would allow a previously cramped and confusing building to blend seamlessly into the identity of the main building.

Finally, to enclose the campus a new classroom corridor to connect the annex and main building is proposed.

NEW / RENOVATION LEVEL 1

- NEW CONSTRUCTION
- RENOVATION

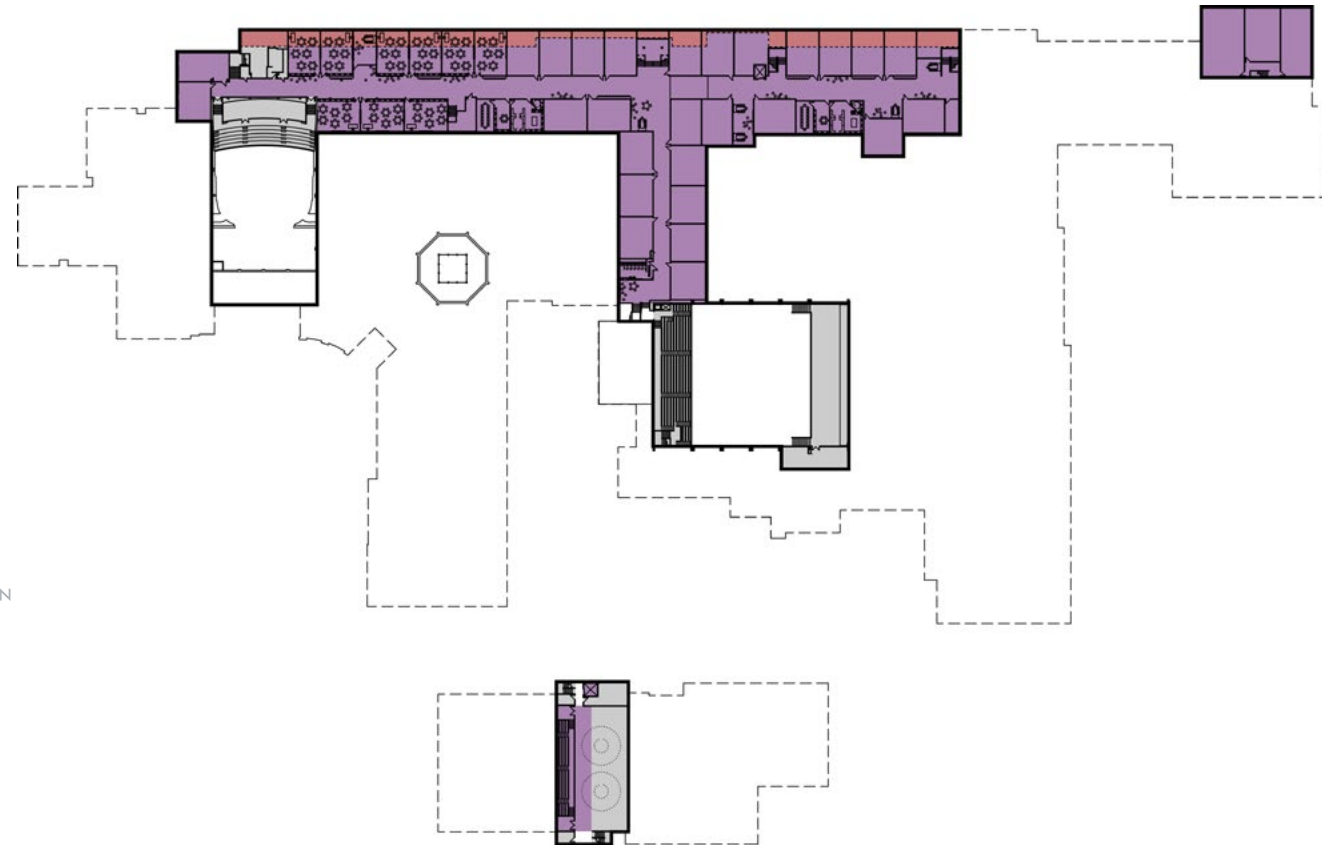


NEW / RENOVATION LEVEL 2

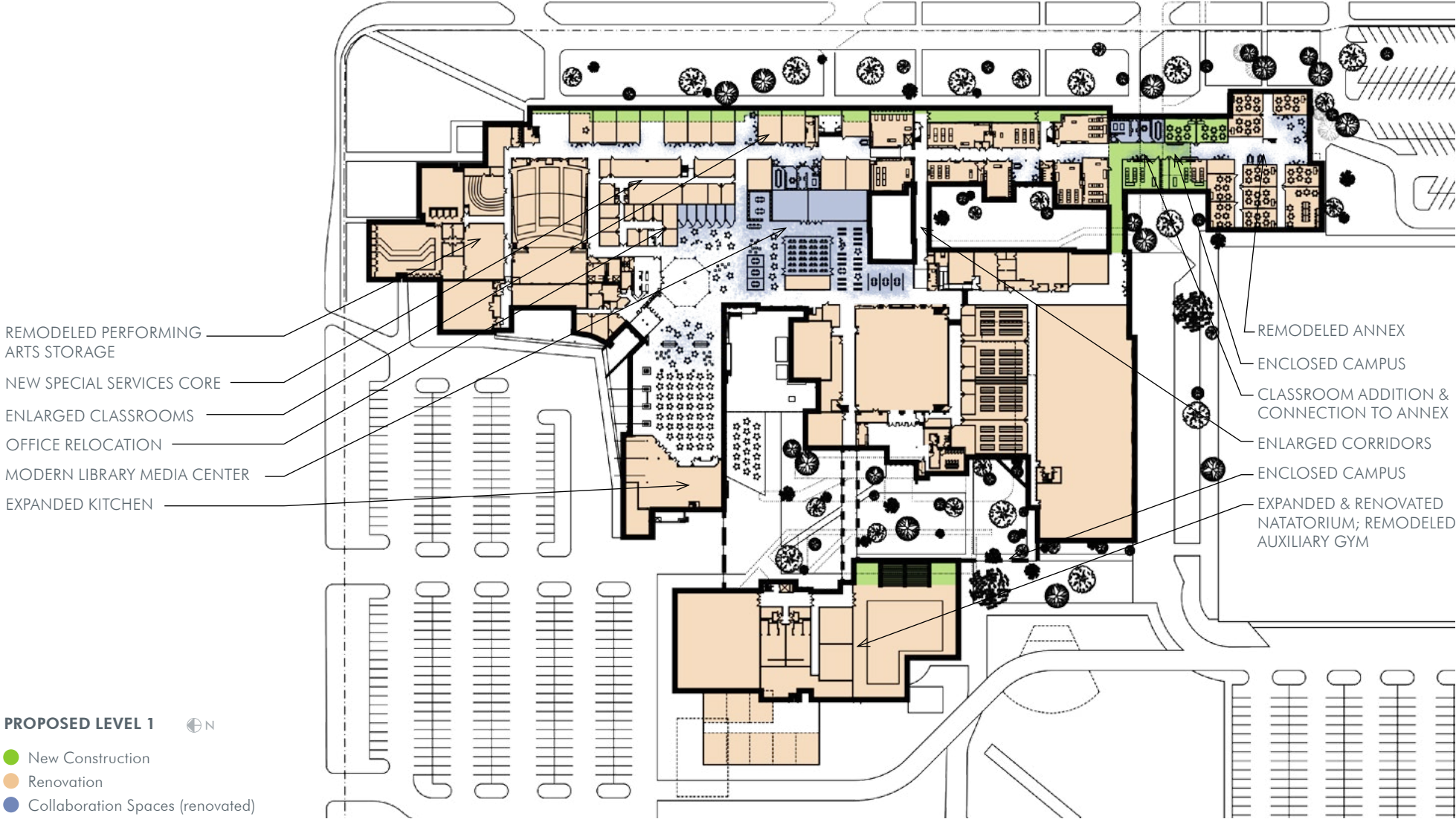


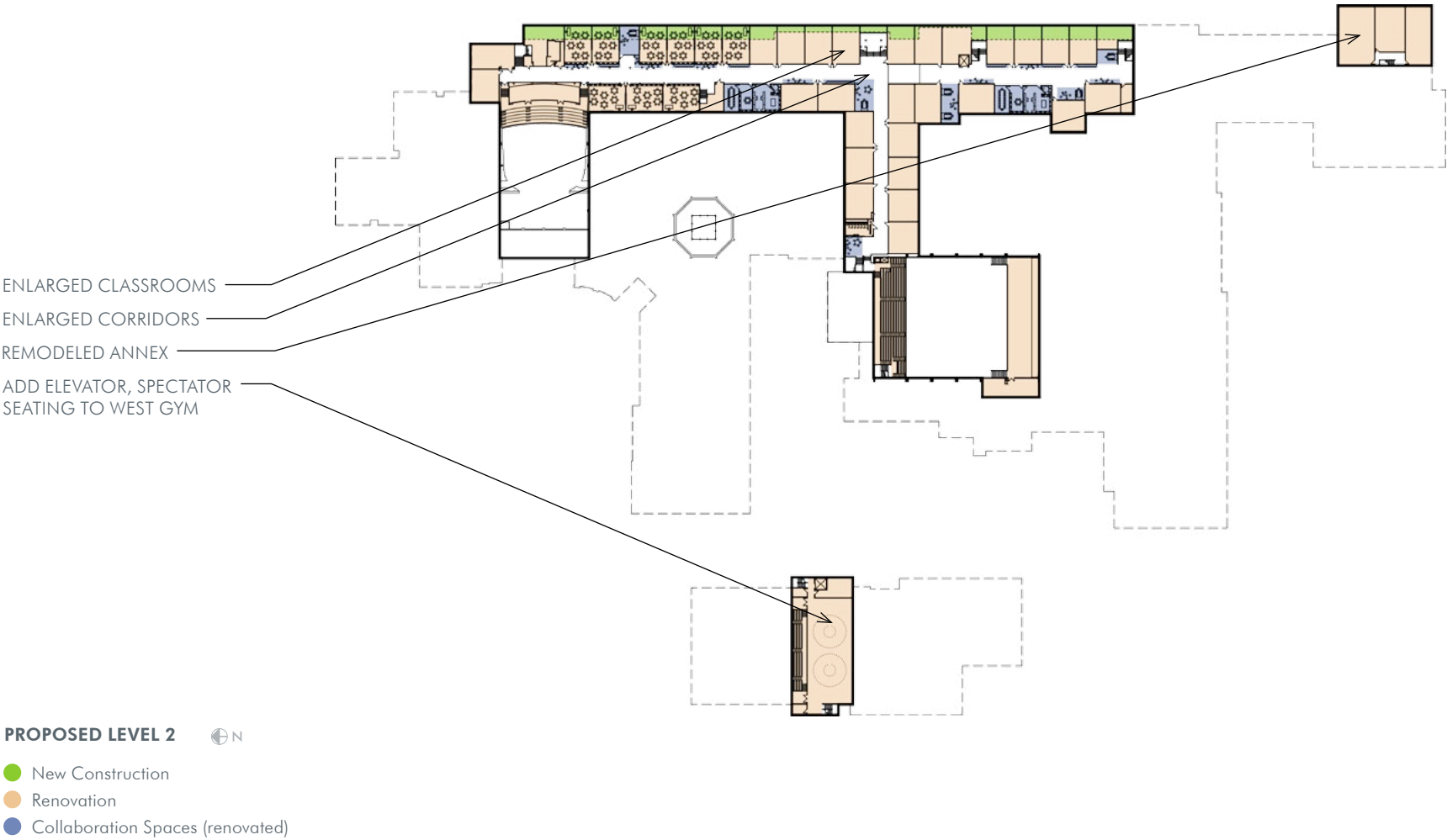
The primary focus of change is to enlarge the classrooms on Level 2. In order to make the classrooms larger, a proposed east expansion can allow the classrooms to be aligned so that their “short” face is to the corridor, instead of their “long” face as was constructed previously

- NEW CONSTRUCTION
- RENOVATION



Lawrence High School





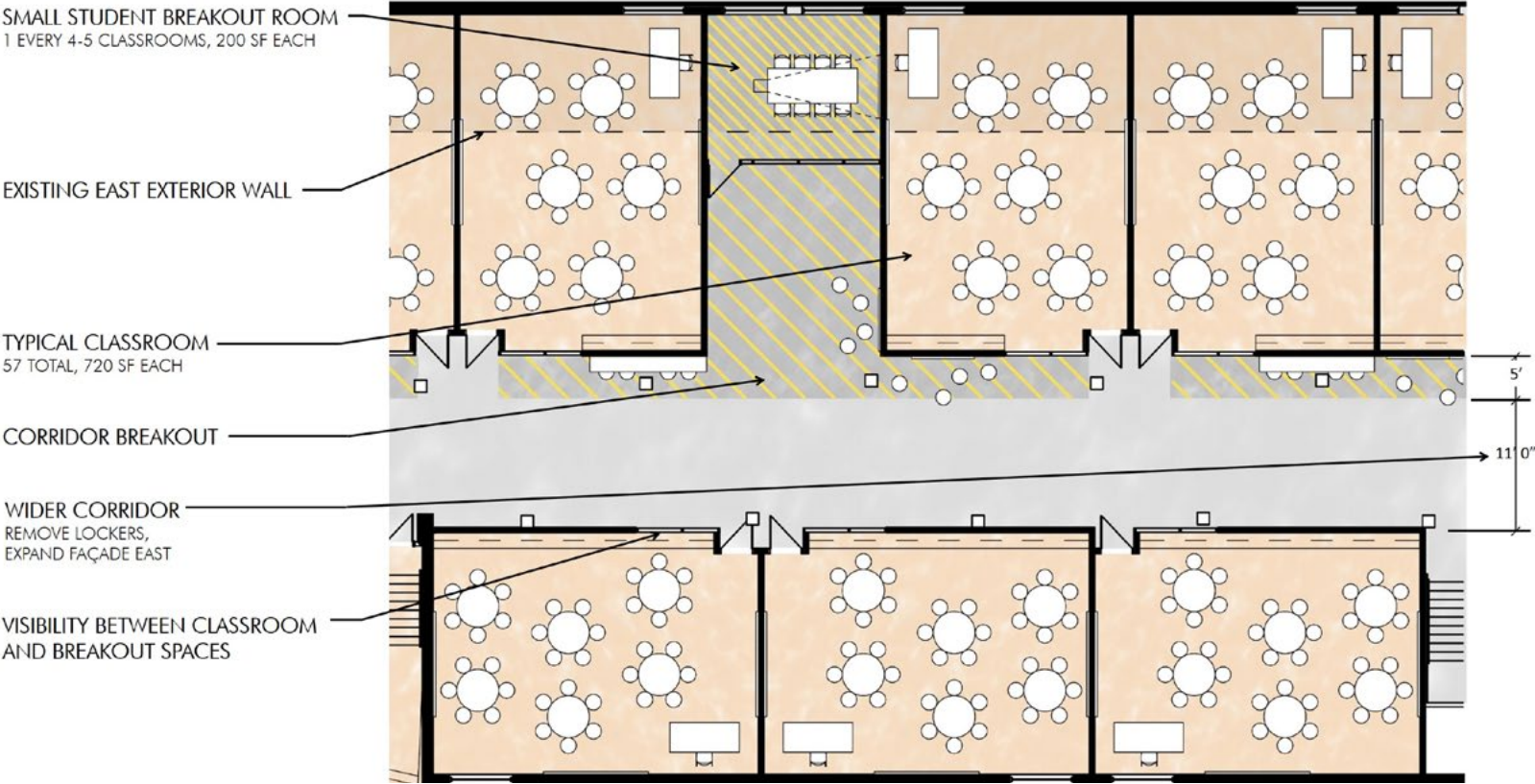
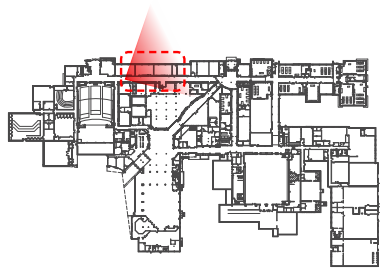
Lawrence High School



CORRIDOR BREAKOUT

In the existing photo above, students and a teacher at LHS are having a “breakout” in the corridor. However, the corridors are flanked by lockers and because of this do not provide seating, white boards, or dedicated breakout space separate from the corridor for this group to gather.

Proposed is a new corridor system in the major classroom corridors with a strip of continuous breakout occurring adjacent to every classroom. Transparency between the classrooms and the corridor allow visibility in and out of the classrooms to the breakout space. A small enclosed breakout for dedicated group meeting occurs every 4-5 classrooms.





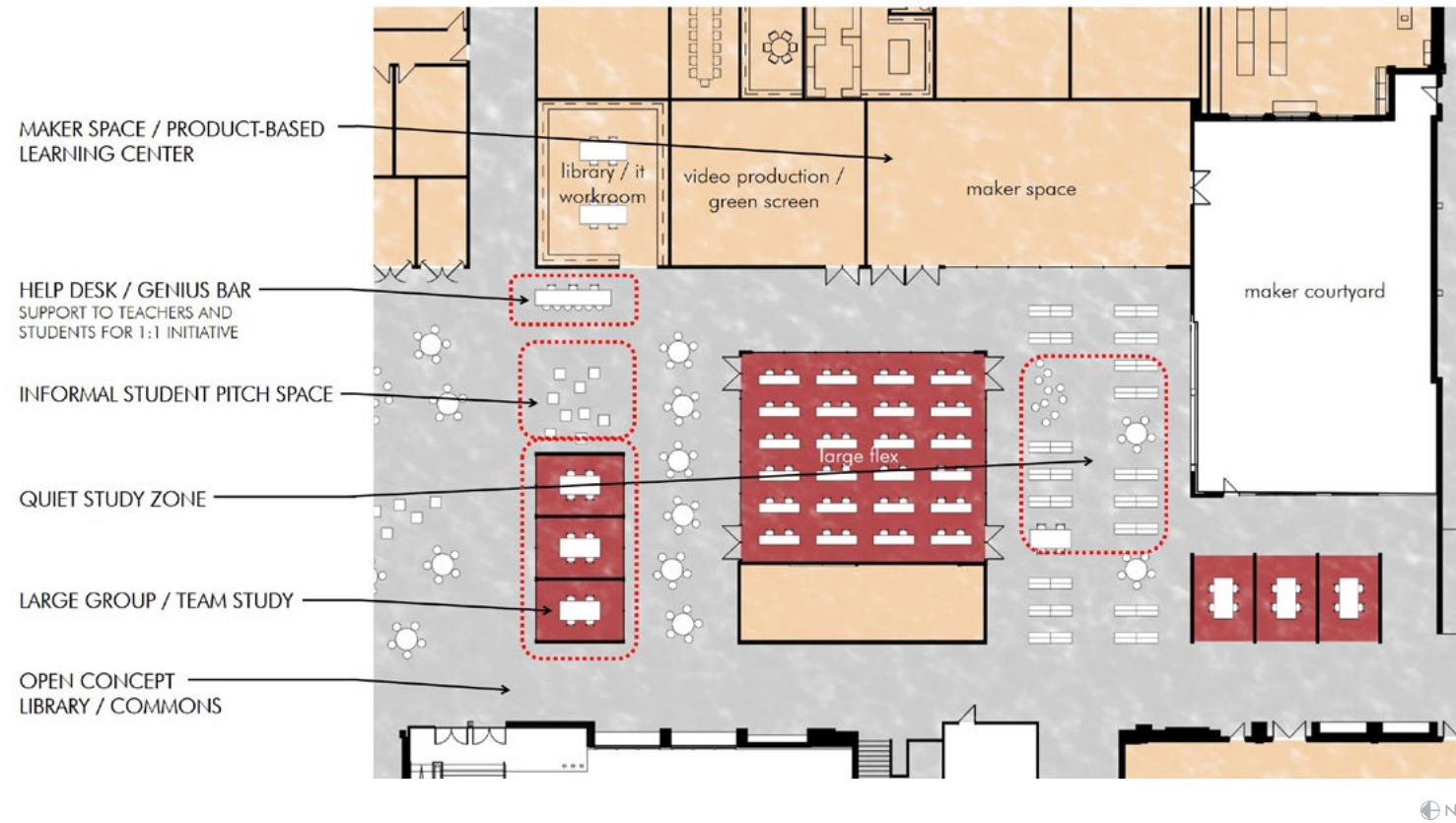
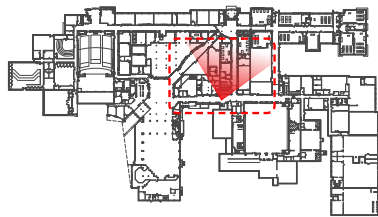
LAWRENCE HIGH SCHOOL TYPICAL CLASSROOM CORRIDOR

Lawrence High School



MODERN MEDIA CENTER

Above is the existing main entry to LHS. The rotunda is a major circulation pathway throughout the day, but does not provide a place for students to meet or do school work. Additionally, the existing library is too small for the student population to gather before classes begin in the morning. Proposed is a modern media center directly adjacent to the rotunda and cafeteria without formal boundaries to allow the student body to gather in the morning. Included is a help desk (like the Apple Genius Bar); a new librarian work room; a mixture of collaborative “social study” spaces, as well as quiet heads-down study zones for students and faculty; and areas scattered throughout dedicated to book stacks.





LAWRENCE HIGH SCHOOL MODERN MEDIA CENTER STUDY

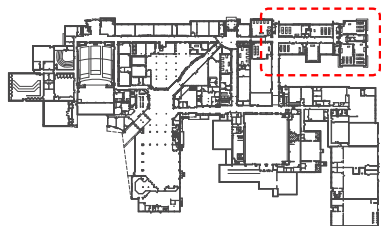
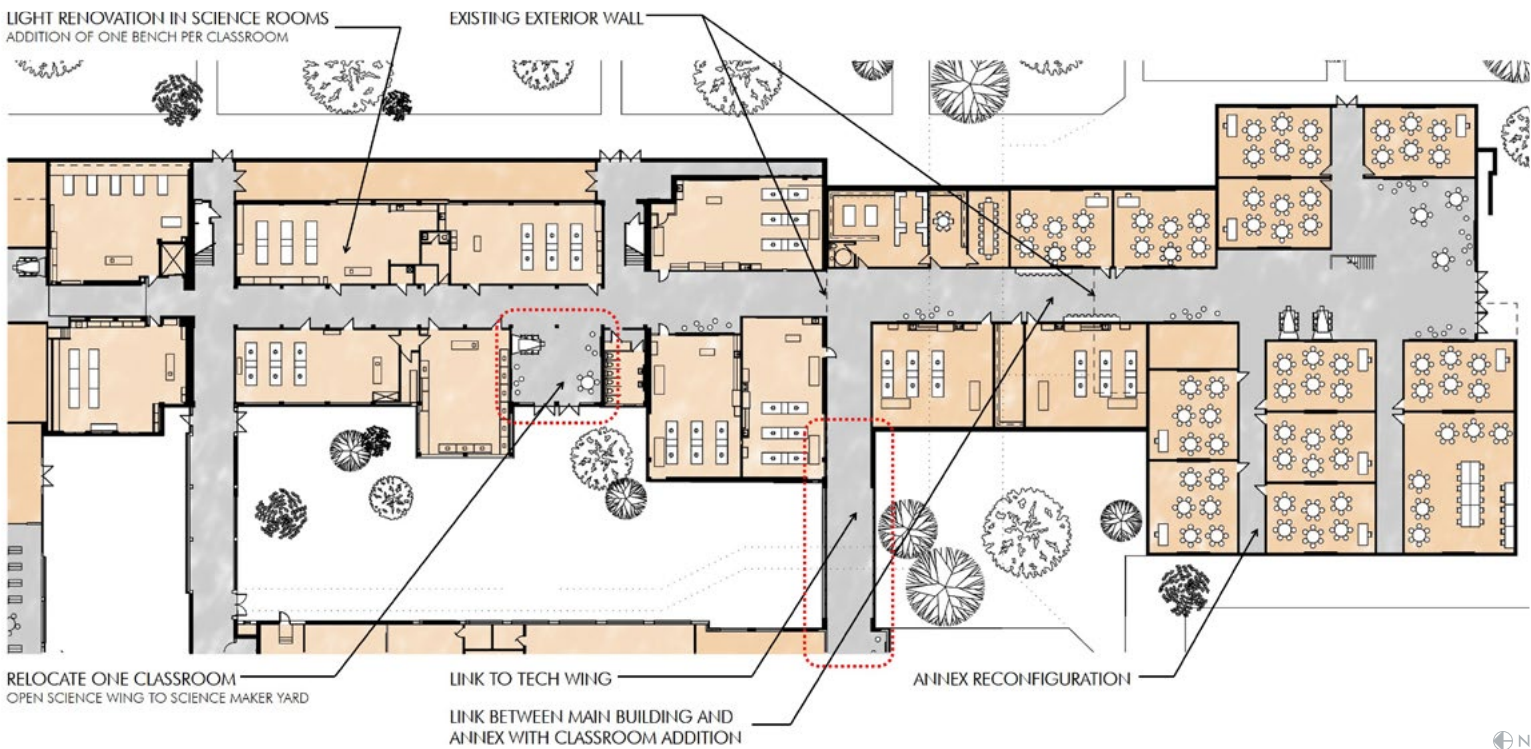
Lawrence High School

ANNEX CONNECTION

Proposed is a reconfiguration of the existing annex and new construction to connect the annex to the main building, allowing students to remain inside during passing periods.

Within this new construction is two new science labs (to replace the two currently on Level 2 and allow all science rooms to be on the first floor), two new classrooms, and the science department faculty breakout.

Another component of new construction is a corridor link to the existing tech wing, to allow students in the annex to more quickly access the modern media centers / main gym and locker rooms / cafeteria / etc. This link encloses an existing courtyard and provides an opportunity for this courtyard to become an outdoor experiment and maker yard for the science classrooms.

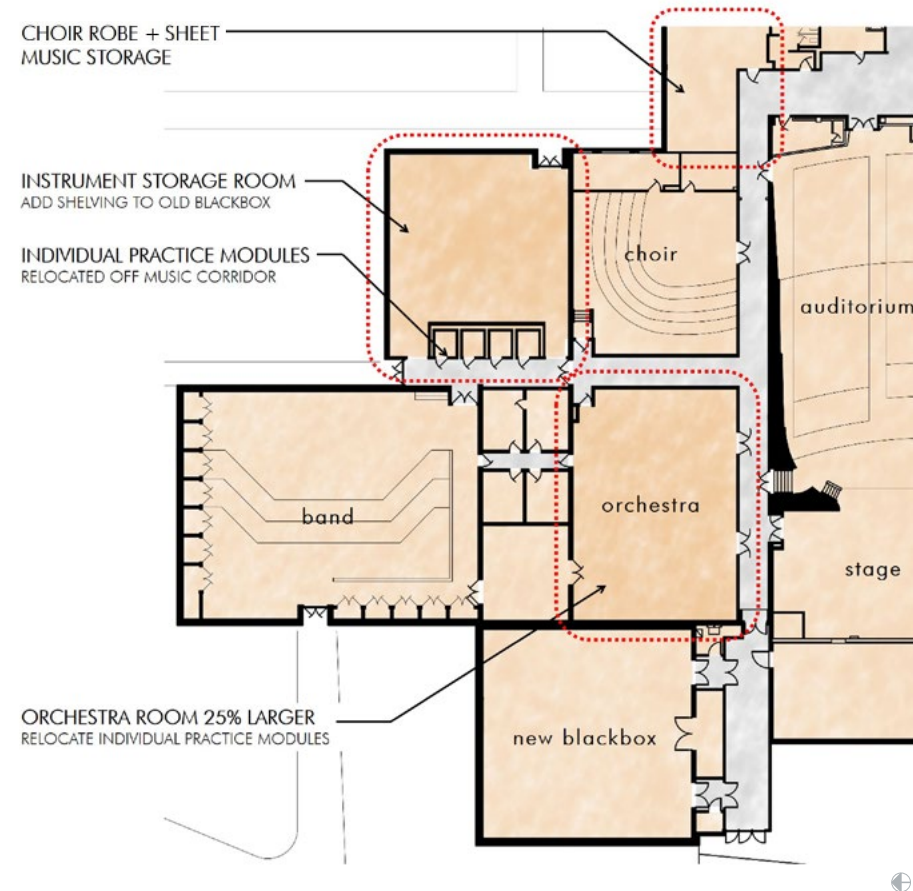
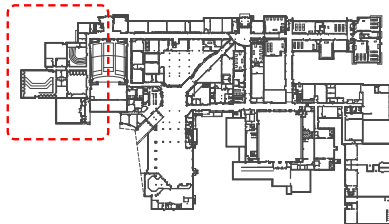




PERFORMING ARTS

Based on conversations with the performing arts faculty, though not perfect, the band and choir rooms are sufficient; however the orchestra room is too small. Currently, temporary practice modules sit inside the orchestra room, making the room too small to be functional. The entire department could also benefit from additional storage.

Proposed is the relocation of practice modules to be off the corridor for use throughout the day and expansion of the orchestra room; instrument storage solutions added to the old black box; and acquiring an existing small classroom to expand choir robe storage. Also in the budget are tech upgrades in the auditorium.



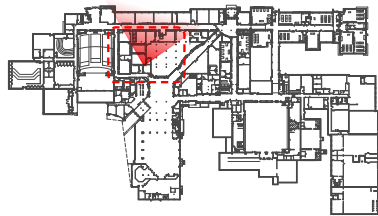
Lawrence High School



STUDENT CENTER + SPED

Currently, the administration offices that house assistant principals and counselors at LHS are not adjacent. In the proposed plan, we have relocated these offices directly adjacent to the front office.

Additionally, a new special services core is located adjacent to all administration and was organized such that 3 flexible classrooms can be opened completely or separated into smaller classrooms with partitions. These classrooms are located directly off the main classroom corridor to provide independence and remove the stigma of students walking in to the labeled “sped” wing of the building.





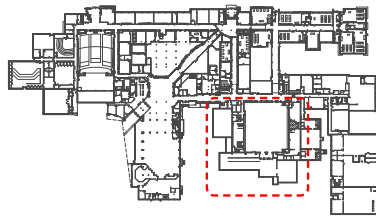
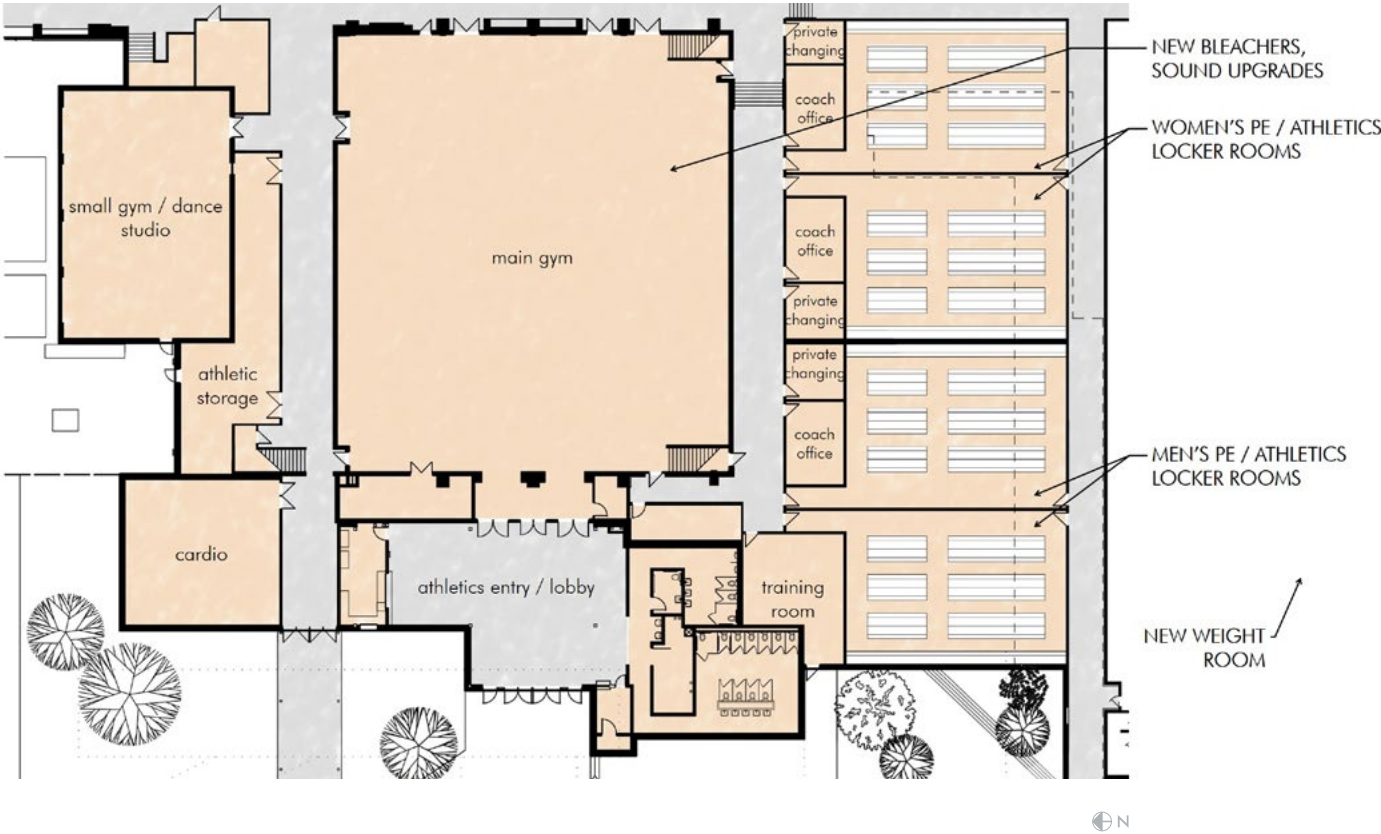
LAWRENCE HIGH SCHOOL STUDENT CENTER

Lawrence High School



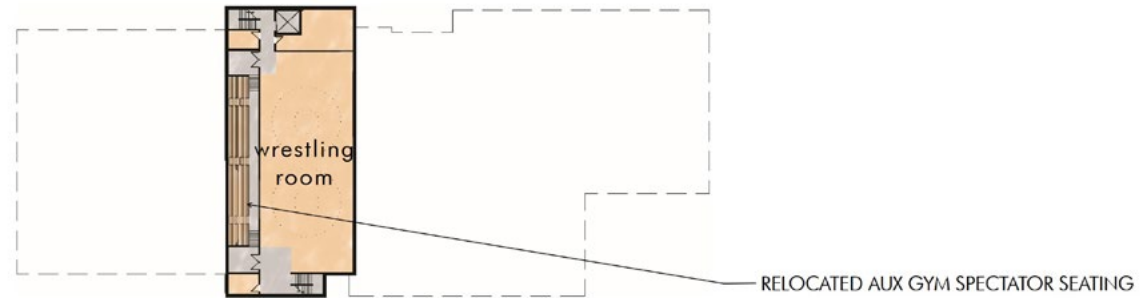
ATHLETICS SPACES

Relocating all locker rooms to one side of the gym allows the space to add a cardio room and additional storage for gym equipment. Additionally, proposed is the relocation and enlargement of the too-small weights room to be adjacent to the locker rooms and front an exterior door for outdoor access.



WEST GYM LEVEL 2

On the second floor is the relocation of spectator seating to create space within the gym for drop-down volleyball nets. An elevator is added to provide ADA accessibility.

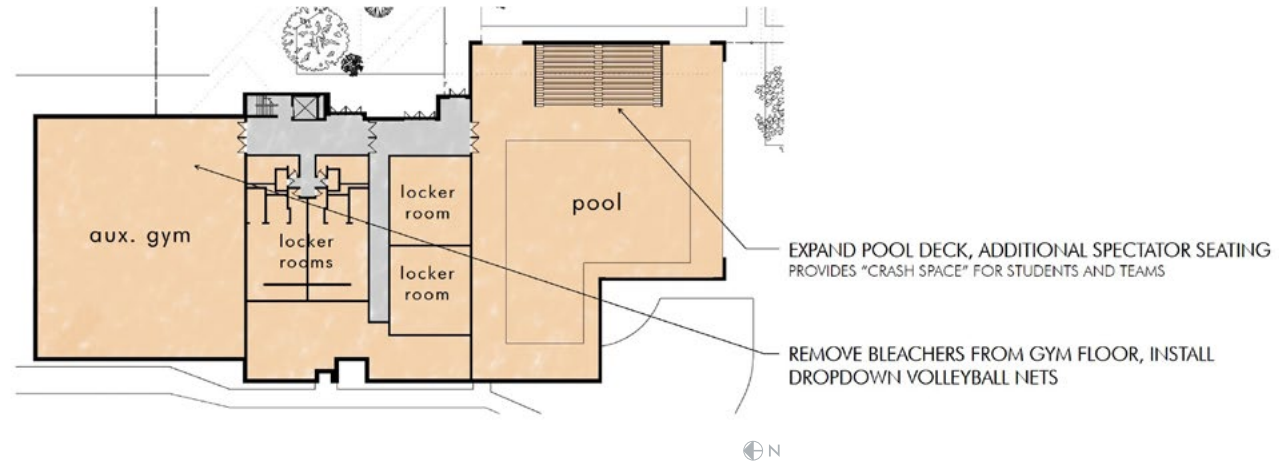


WEST GYM + NATATORIUM LEVEL 1

The pool in the existing natatorium is in good shape, however not enough spectator seating is provided for large meets. Additionally, the space is cramped because teams do not have a place to stay during downtime within the natatorium.

Proposed is the expansion to the east of the pool deck and spectator seating.

Additionally, a new HVAC system is proposed to allow the natatorium to be used year-round.

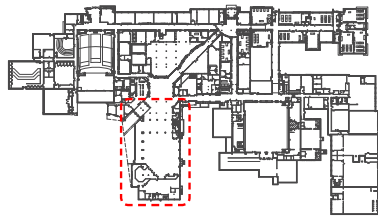
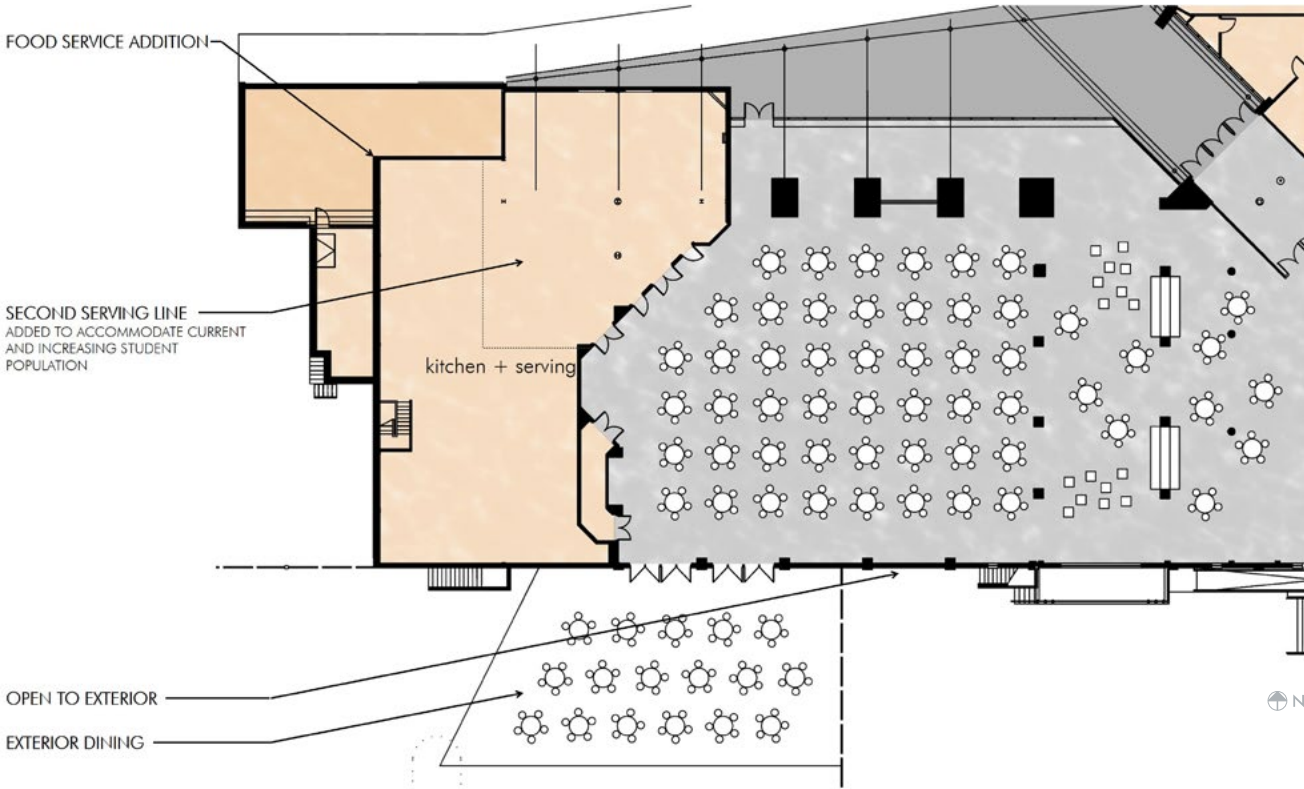


Lawrence High School



FOOD SERVICE EXPANSION

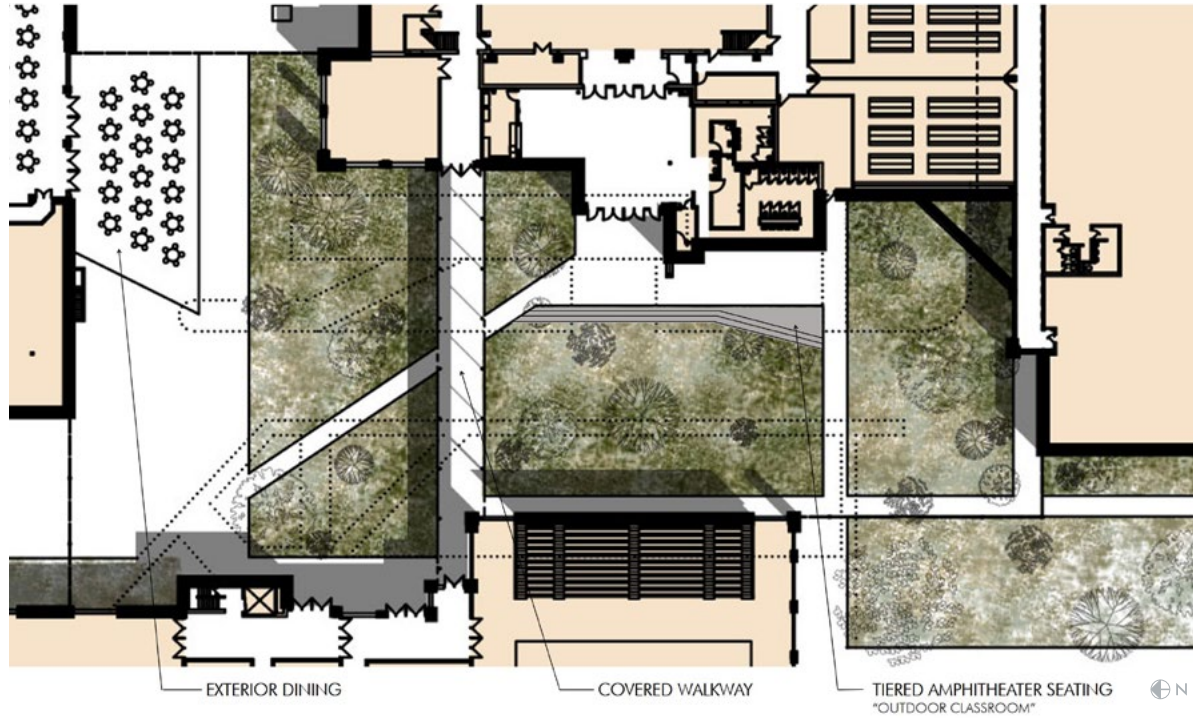
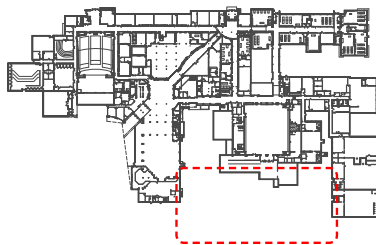
An addition and expansion to the food services is proposed to allow the serving area to grow and potentially serve the entire student body, if the district ever decides to move to a closed campus. This addition does not expand the size of the cafeteria, but a proposed exterior dining patio would provide additional seating during lunch and provide an outdoor space for students to use throughout the day.





MAIN EXTERIOR CORRIDOR

A proposed covered walkway connecting the main building and west gym would provide protection from the elements to students. Architectural gates give the option of securing the courtyard during school hours and amphitheater-style seating is proposed to provide a place for a class to gather.



Free State High School

REPAVE EXISTING PARKING LOT

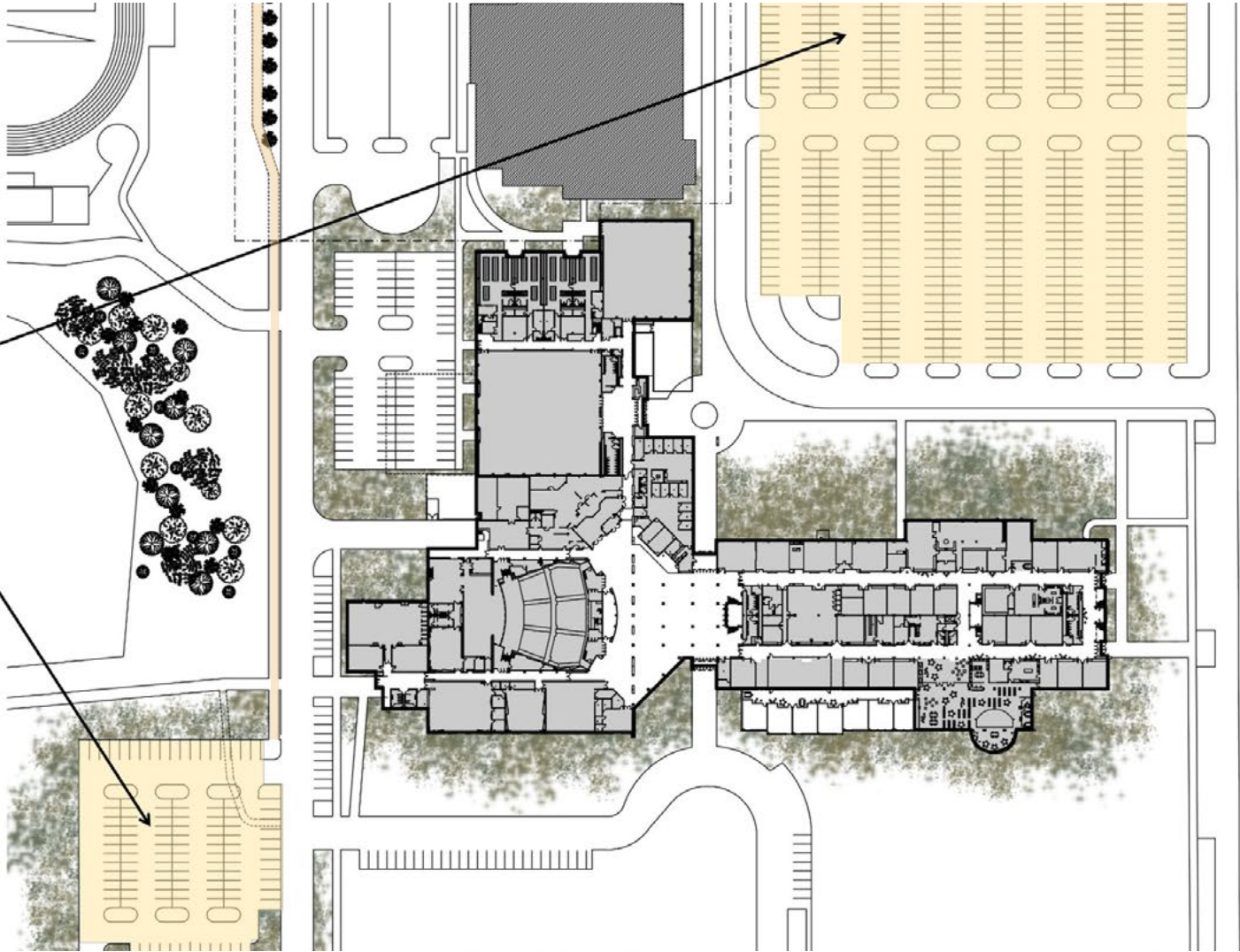
NEW PARKING LOT TO
ACCOMMODATE UP TO 100
ADDITIONAL SPOTS

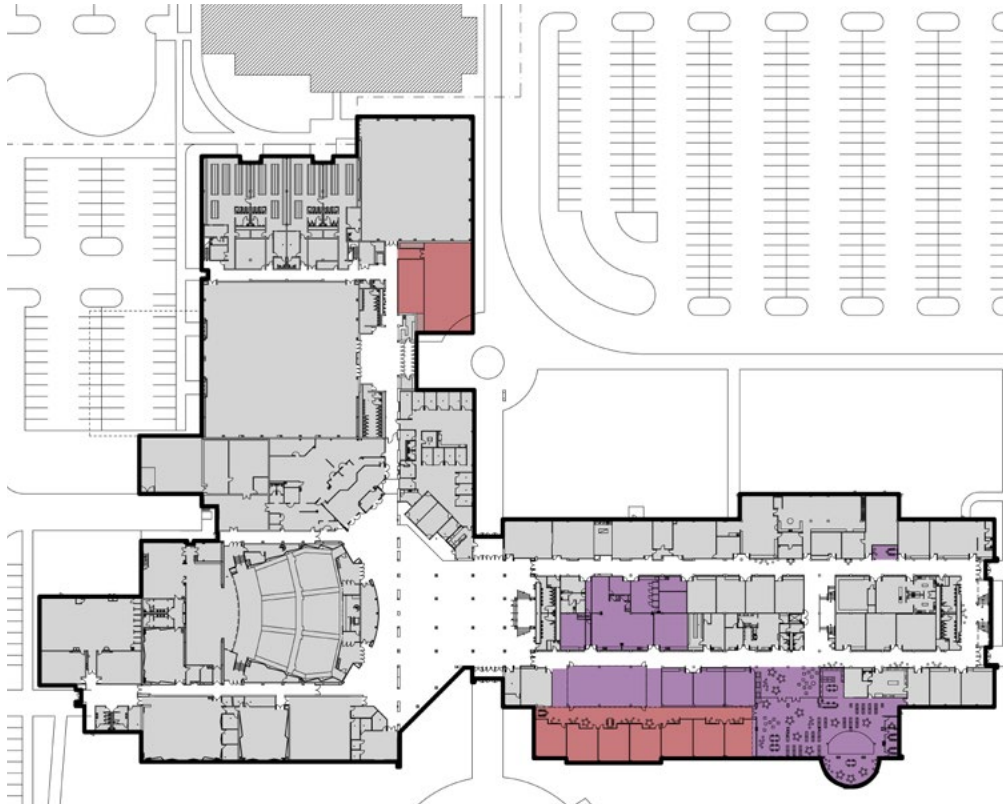
SITE IMPROVEMENTS



Proposed is the resurfacing of Free State's main parking lot, which has not been resurfaced since construction of the building almost 20 years ago.

Additionally, a new parking lot for outdoor athletics events is proposed south of the baseball fields.

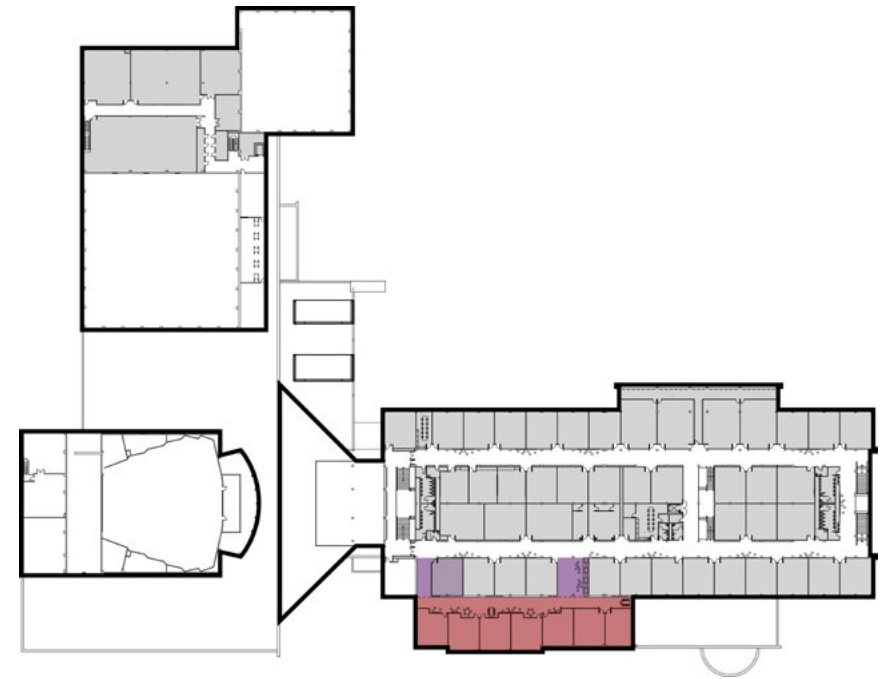




NEW / RENOVATION, LEVEL 1



- NEW CONSTRUCTION
- RENOVATION



NEW / RENOVATION, LEVEL 2



- NEW CONSTRUCTION
- RENOVATION

Free State High School

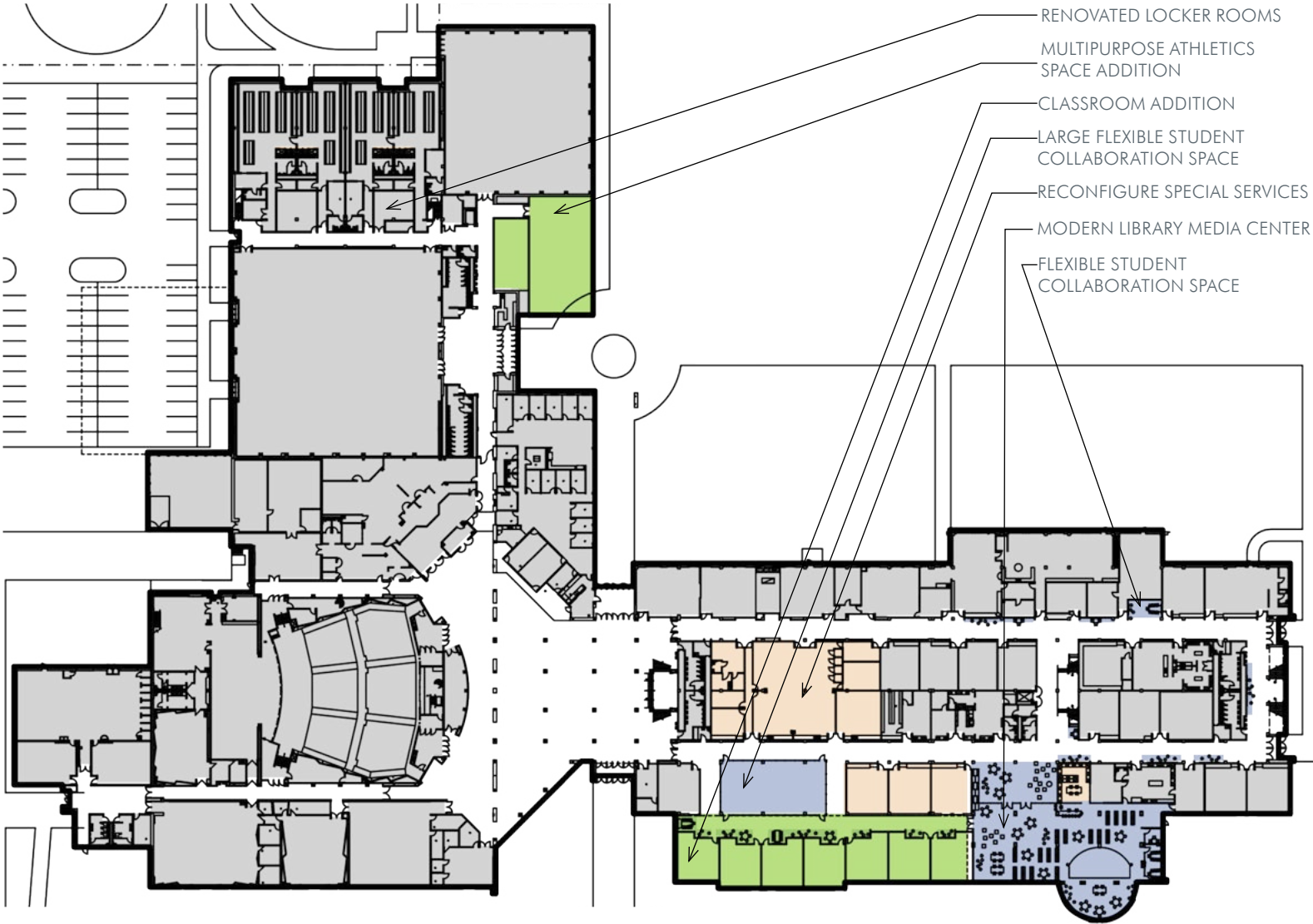
Free State is close to reaching capacity in their existing building. Based on our classroom utilization analysis we assumed a growth of 7 classrooms to allow Free State to grow to 2,000 students if necessary. This classroom addition is proposed to the south of the building. Also included in the proposal is a large multipurpose athletics room, to lessen the burden of over-scheduled gymnasiums during and after school hours.

In addition to these two additions, renovations include the following:

- 1. Reconfiguration of the Special Services department
- 2. Renovation of the existing library / media
- 3. A new large flex room for 100+
- 4. Furniture solutions throughout the corridors for classroom-adjacent breakout

PROPOSED LEVEL 1

- NEW CONSTRUCTION
- RENOVATION
- COLLABORATION (renovated)



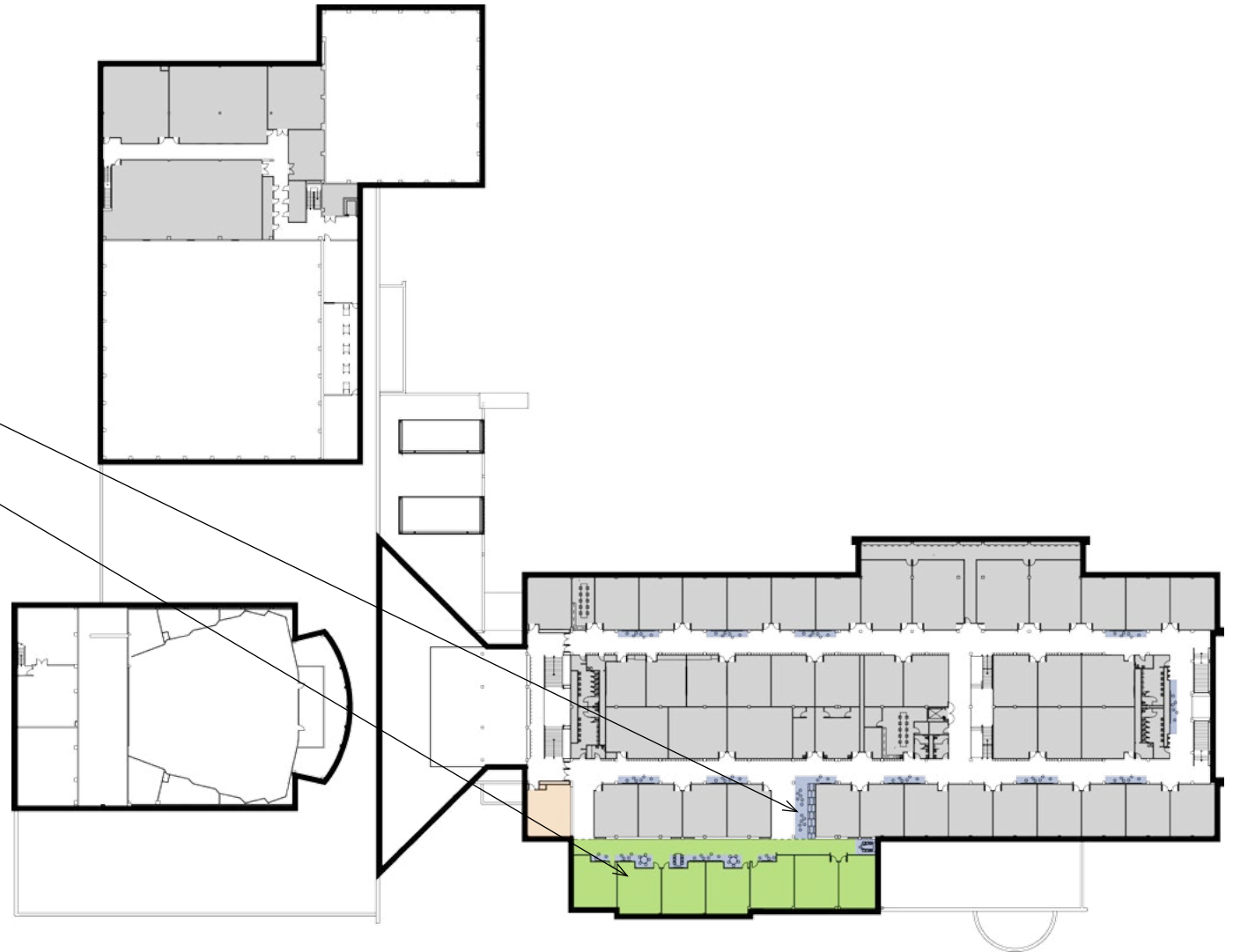
FLEXIBLE STUDENT
COLLABORATION SPACE

CLASSROOM ADDITION

PROPOSED LEVEL 2



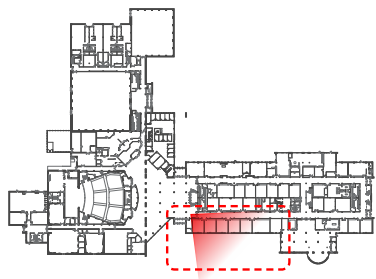
- NEW CONSTRUCTION
- RENOVATION
- COLLABORATION (renovated)



Free State High School

This enlarged floor plan articulates a few details of the proposed classroom addition. The addition of new classrooms provides an opportunity to create visual transparency between the proposed flex room and the adjacent classrooms, which can begin to create an “innovation wing,” or a set of classrooms focused on project-based learning.

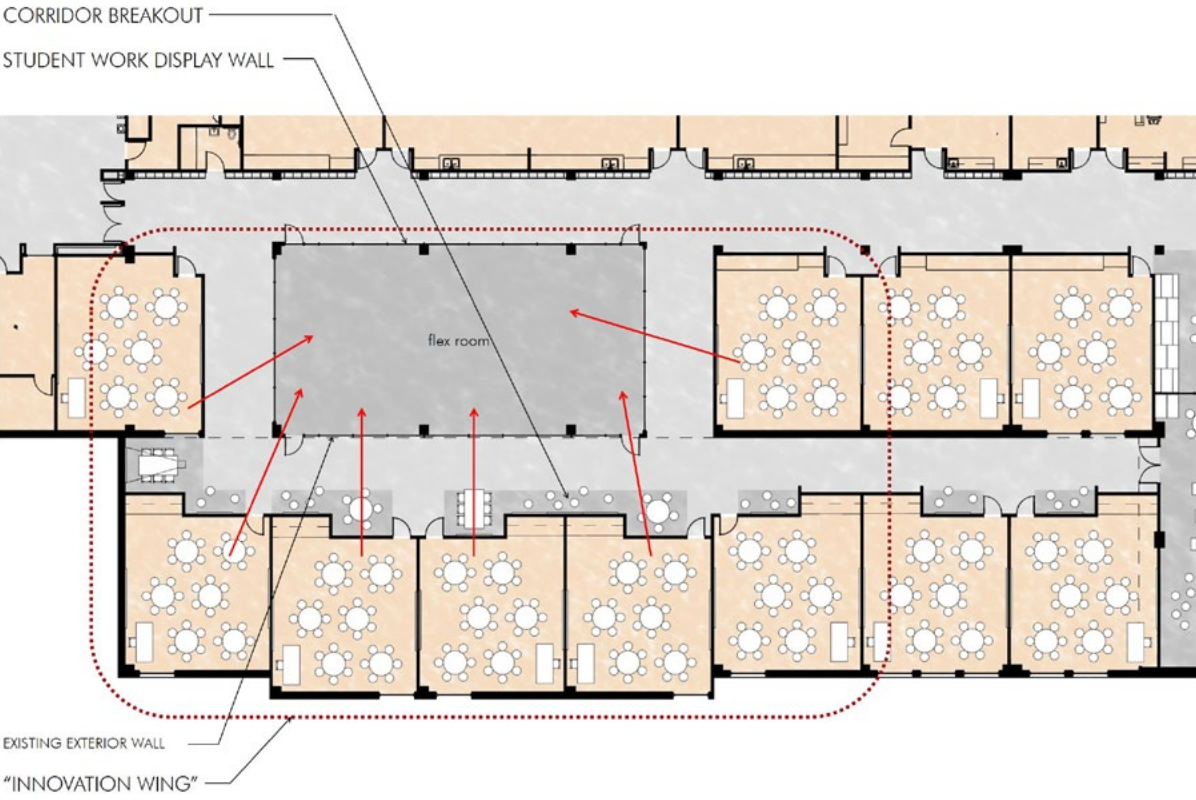
The render on the right displays how the flex room can become very transparent to put “learning on display,” a feature observed in the regional benchmarks and models of 21st century learning.



- INNOVATION WING
- NEW COLLABORATION SPACES
- RENOVATED SPACES
- SIGHT LINES, CR TO FLEX



LEARNING ON DISPLAY ALONG PRIMARY CIRCULATION PATHS

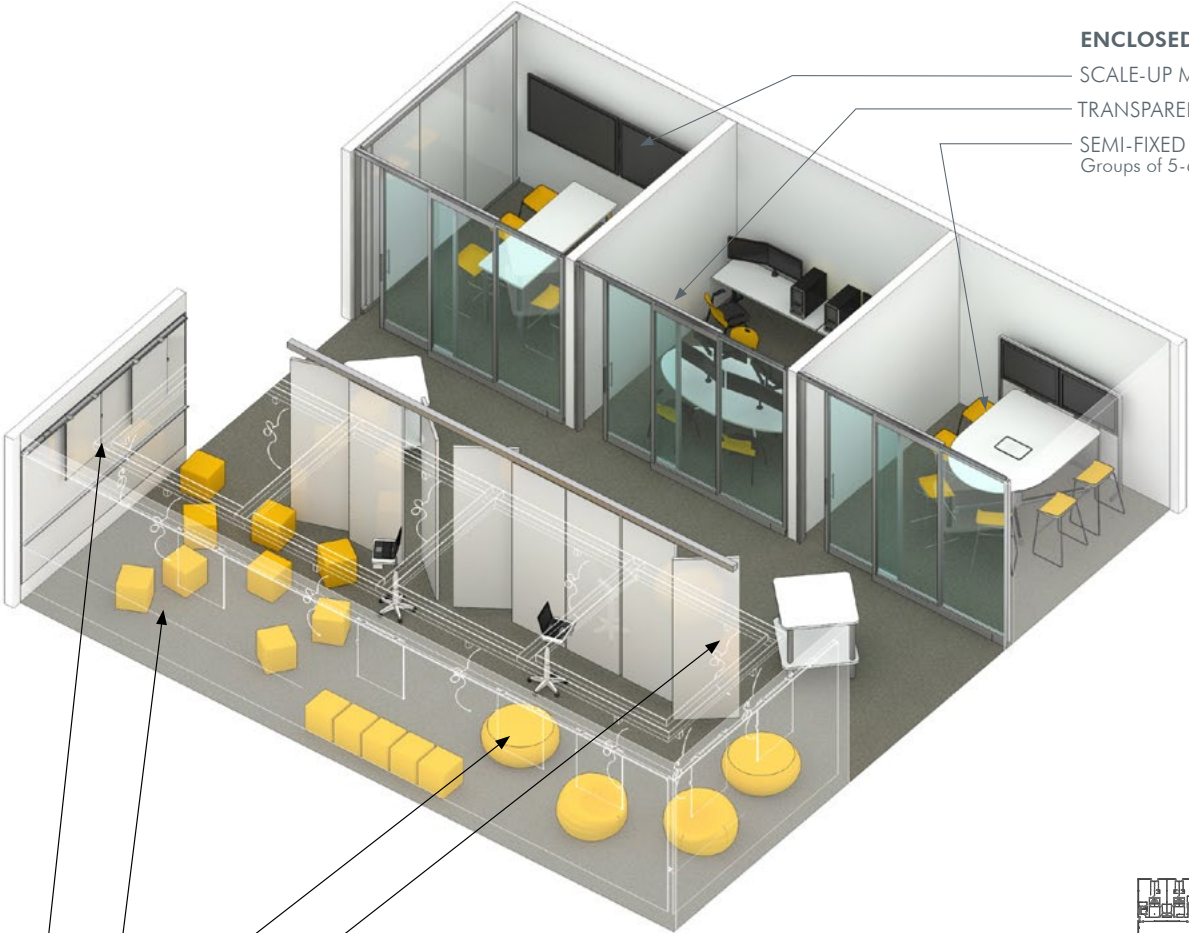




FREE STATE HIGH SCHOOL LARGE FLEX ROOM

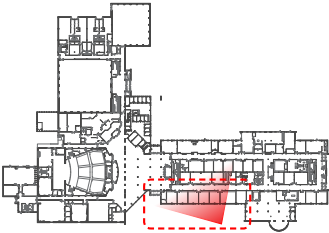
Free State High School

This diagram illustrates the concept of how the large flex room at Free State adjacent to classrooms can become a fluid and transparent learning space. Allowing for casual student breakout directly adjacent to classrooms can provide for group work to occur while still under the direction of a teacher. Additionally, the space can be used by multiple classes, resulting in inter-disciplinary collaboration.



- ENCLOSED BREAKOUT SPACES
- SCALE-UP MEDIA SETUP
- TRANSPARENCY TO LARGE FLEX SPACE
- SEMI-FIXED SEATING
Groups of 5-6, extended use

- LARGE FLEX BREAKOUT SPACES
- GROUP COLLABORATION
- SOFT SEATING, FLEXIBLE LAYOUT
- TRANSPARENCY, FLEXIBLE WALLS





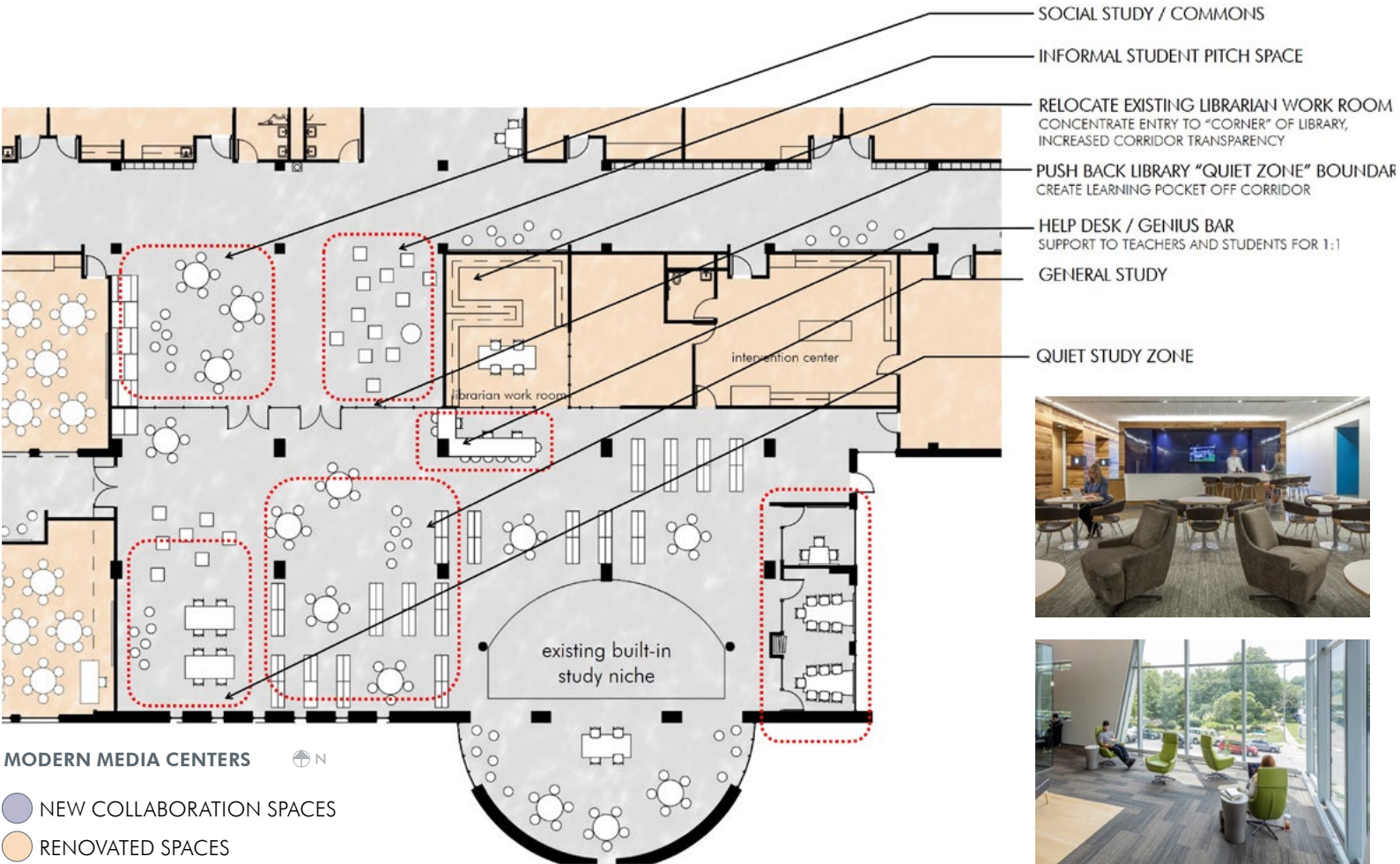
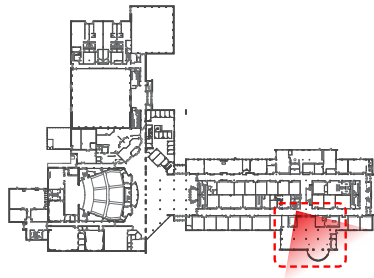
FREE STATE HS INNOVATION WING

Looking into Large Flex Space from Classroom

Free State High School

This enlarged floor plan of the modern media center at FSHS begins to highlight some of the major components being implemented in the space. By pushing back the boundary of the library to the corridor and making this boundary transparent, the library is transformed to become less a destination, and more an integral part of the corridor used throughout the course of the day.

Included is a help desk (like the Apple Genius Bar) that can house the librarian, an IT specialist, and a student helper to provide tech and device troubleshooting to students and faculty; a new librarian work room; a mixture of collaborative “social study” spaces for groups to meet, as well as quiet heads-down study zones for prolonged periods of study or private time for students and faculty; and areas scattered throughout dedicated to book stacks.





media center

FREE STATE HIGH SCHOOL MODERN MEDIA CENTER ENTRY

Free State High School

ATHLETICS IMPROVEMENTS

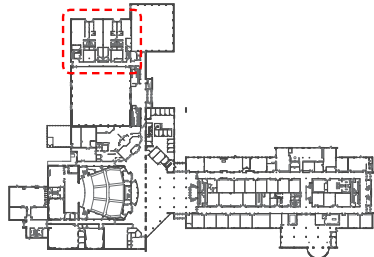
When analyzing the existing and proposed athletics spaces at the high schools, the need for a large multi-purpose athletics space arose

This space allows more physical education activities to occur throughout the day, as well as an outlet for after-school practice scheduling conflicts.

Replacing the “gang” showers with individual stalls in all four locker rooms allows an increase in number of lockers available to both physical education students and athletes.

REPLACE GANG SHOWERS WITH INDIVIDUAL STALLS
GAIN UP TO 1,000 TOTAL LOCKERS

MULTIPURPOSE ATHLETICS ROOM



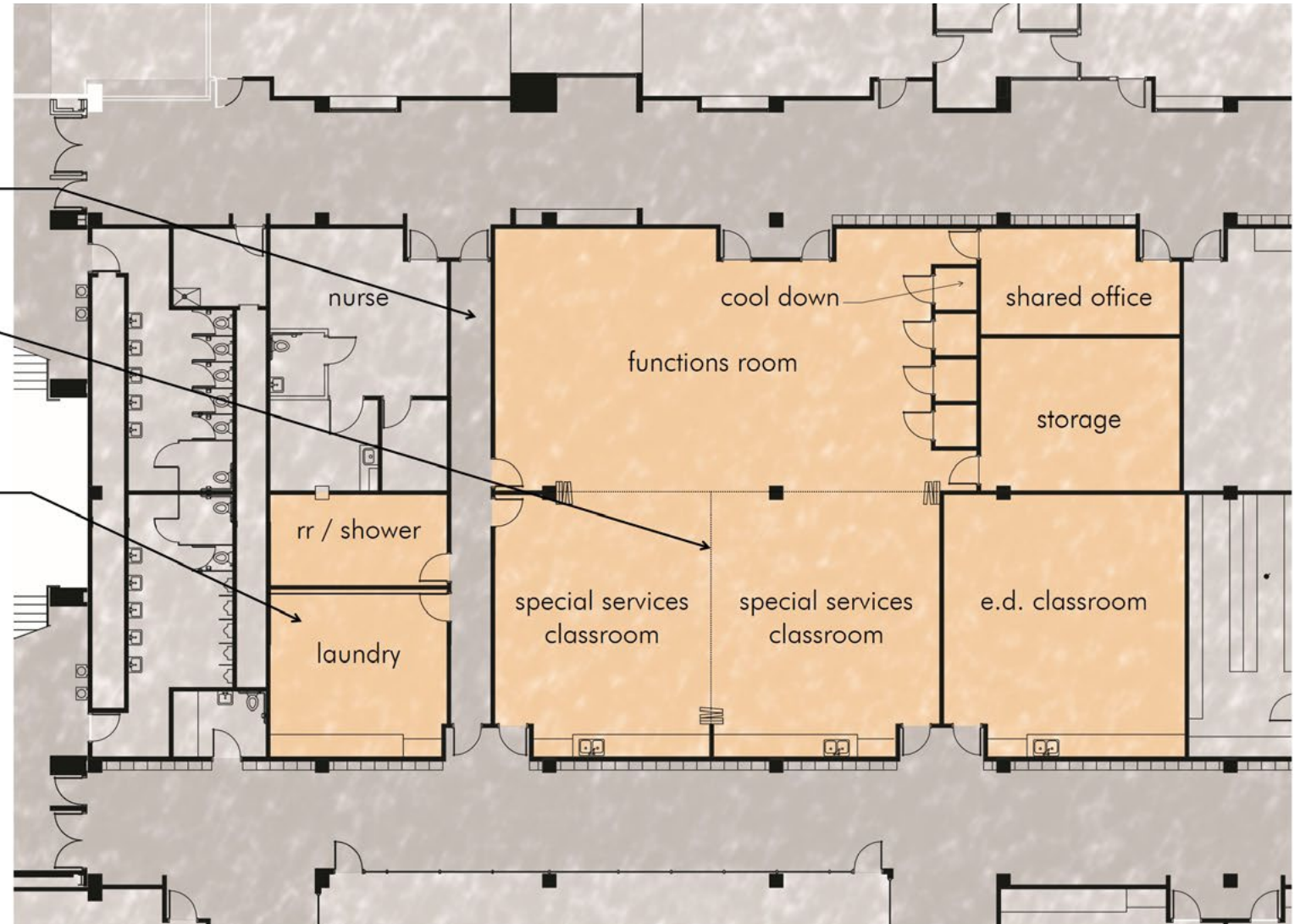
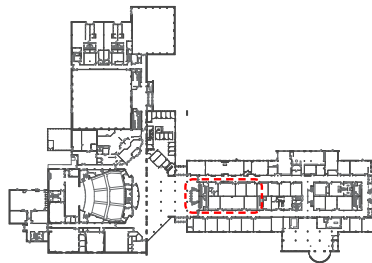
SPECIAL EDUCATION

The need for more flexible classrooms within special services was a need of both high schools. Because the number of students and their needs change on a yearly basis, flexibility is key.

SECONDARY SPED CORRIDOR

PARTITIONS TO CREATE
MAXIMUM FLEXIBILITY
WITHIN SERVICES

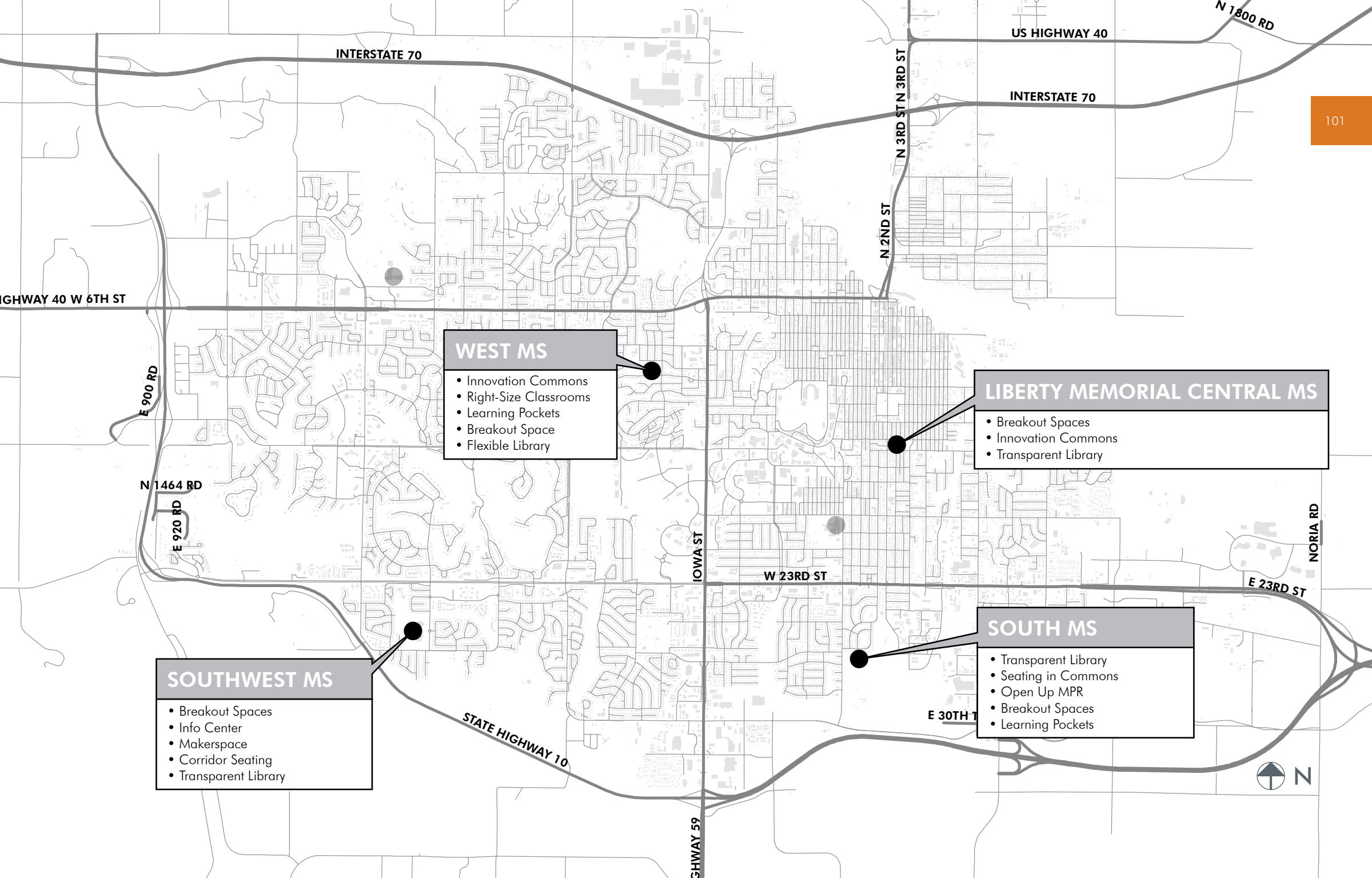
NEW LAUNDRY ROOM



A MASTERPLAN FOR LAWRENCE MIDDLE SCHOOLS

The identified needs at the middle schools includes the implementation of 21st century learning (learning everywhere) and the accommodation of student privacy in the locker rooms.

A major theme at all four middle schools is a renovation in the library / media center that involved opening up the space to put learning and discovery on display. Additionally, the creation of learning pockets scattered throughout the schools provides a series of breakout spaces adjacent to classrooms.



INTERSTATE 70

US HIGHWAY 40

N 1800 RD

INTERSTATE 70

GHWAY 40 W 6TH ST

N 3RD ST
N 2ND ST

WEST MS

- Innovation Commons
- Right-Size Classrooms
- Learning Pockets
- Breakout Space
- Flexible Library

LIBERTY MEMORIAL CENTRAL MS

- Breakout Spaces
- Innovation Commons
- Transparent Library

SOUTHWEST MS

- Breakout Spaces
- Info Center
- Makerspace
- Corridor Seating
- Transparent Library

SOUTH MS

- Transparent Library
- Seating in Commons
- Open Up MPR
- Breakout Spaces
- Learning Pockets

IOWA ST

W 23RD ST

NORIA RD

E 23RD ST

E 30TH ST

STATE HIGHWAY 10

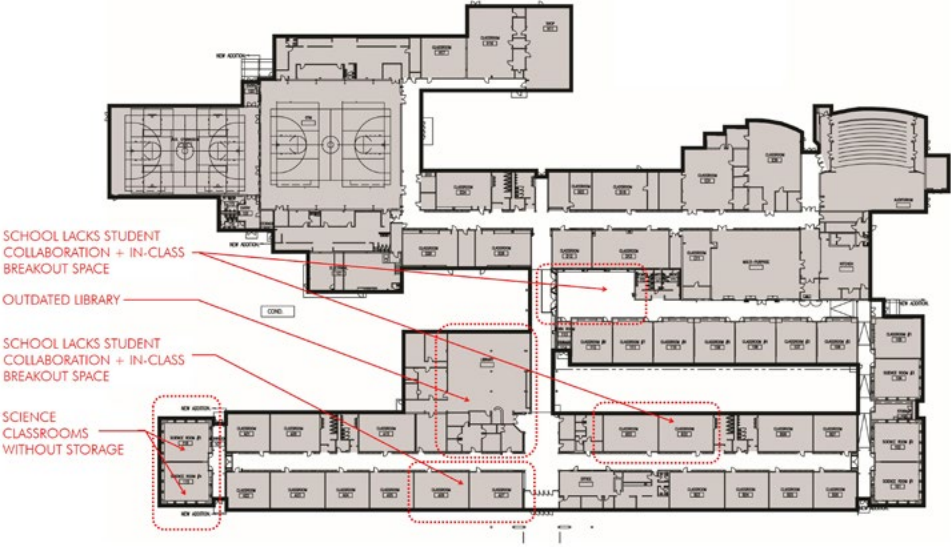
GHWAY 59



West Middle School



EXISTING CORRIDOR



NEEDS ADDRESSED

West Middle School is a traditional double-loaded corridor building constructed in the 1960s. The major issue to address at WMS is the lack of student breakout space and updating the library and media center.

Proposed renovations include strategically “right-sizing” a handful of oversized classrooms in the 7th and 8th-grade corridors to create a student

breakout, adding furniture solutions to the current 6th-grade commons, and removing a few bounding walls in the library to open up the space and create collaboration and breakout zones within the library itself. Lastly, within the right-sizing of classrooms, we have created an additional science storage classroom for the two science rooms located on the west side of the building, which will free up additional corridor breakout.



NEW / RENOVATION LEVEL 1

- NEW CONSTRUCTION
- RENOVATION

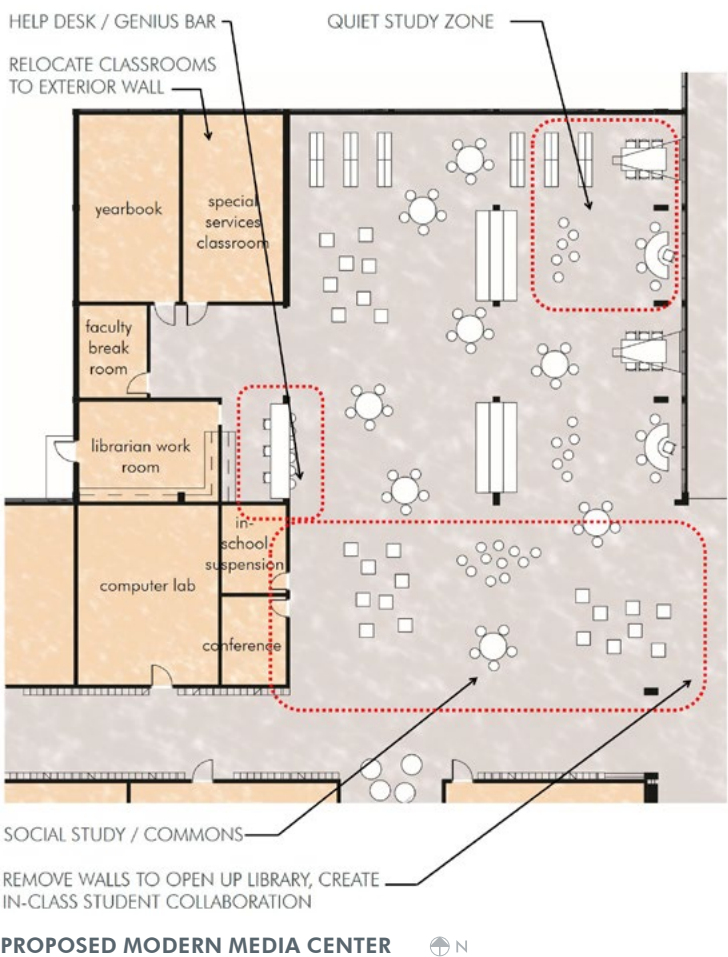


West Middle School: Modern Media Centers

This enlarged floor plan of the new modern media center at WMS begins to highlight some of the major components being implemented in the space. Included is a help desk (like the Apple Genius Bar) that can house the librarian, an IT specialist, and a student helper to provide tech and device troubleshooting to students and faculty; a new librarian work room and storage; a new faculty break room and two relocated classrooms, all with natural lighting; a mixture of collaborative “social study” spaces for groups to meet, as well as quiet heads-down study zones; and areas scattered throughout dedicated to book stacks.



EXISTING WMS LIBRARY ENTRY



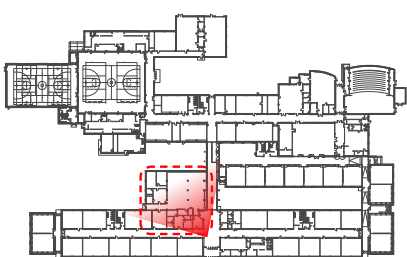
QUIET STUDY ZONE



STUDY COMMONS



HELP DESK

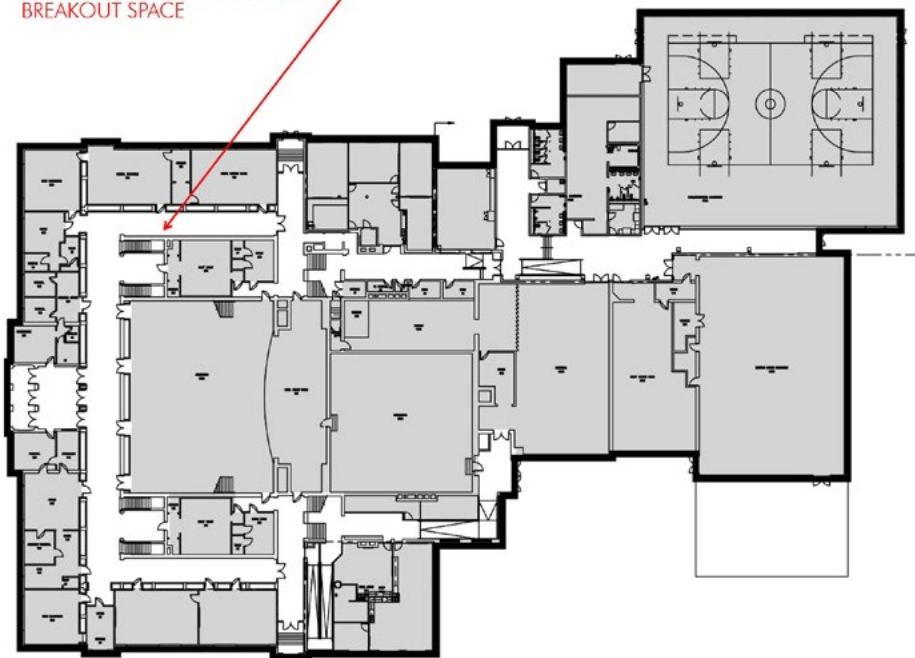




WEST MIDDLE SCHOOL MODERN MEDIA CENTER

Liberty Memorial Central Middle School

SCHOOL LACKS STUDENT COLLABORATION + IN-CLASS BREAKOUT SPACE



NEEDS ADDRESSED, LEVEL 1



Liberty Memorial Central Middle School is a building constructed originally as a high school in the 1920s. This building is very historic, and so we looked for solutions to create 21st century learning while preserving the historic nature of the building. A great feature of LMCMS is their extra-wide

corridors. These corridors provide a major opportunity to be used as breakout pockets. On Level 1, this is in the form of secondary corridors becoming small breakout, and minor renovations to create two large group breakout spaces.



NEW / RENOVATION, LEVEL 1



- NEW CONSTRUCTION
- RENOVATION

LARGE GROUP FLEX SPACE

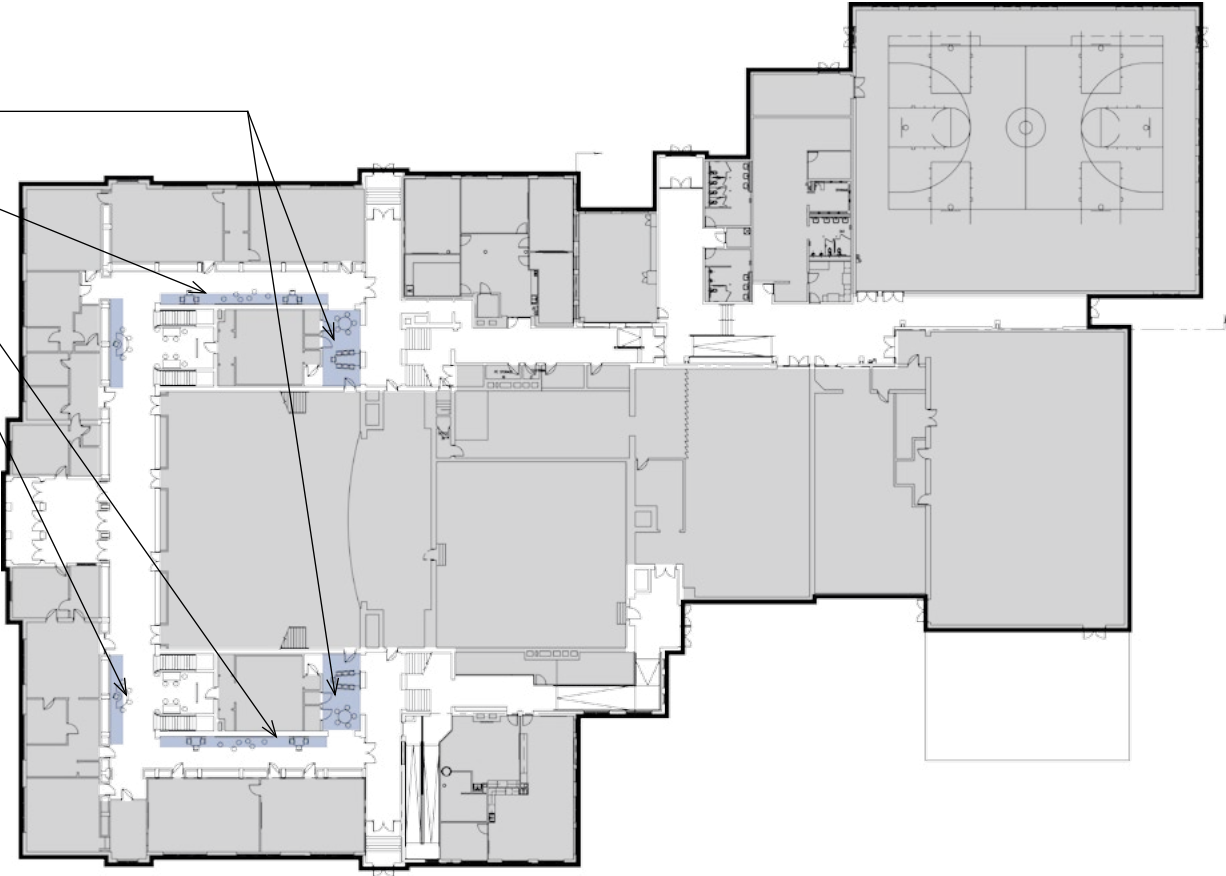
SMALL GROUP FLEX SPACE

LEVEL 1 PROPOSED

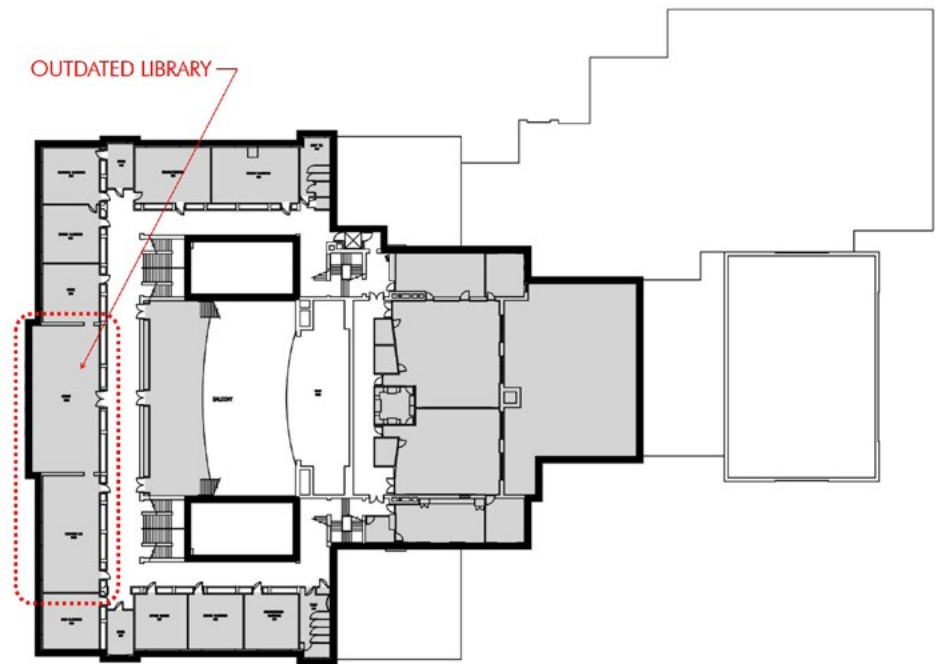


RENOVATED SPACES

COLLABORATION (renovated)



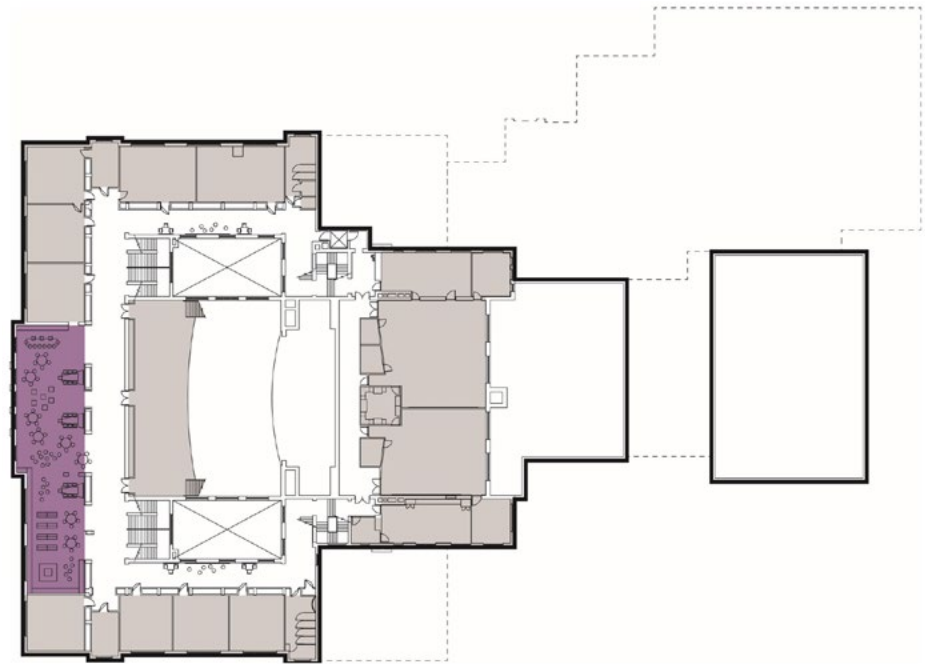
Liberty Memorial Central
Middle School



NEEDS ADDRESSED, LEVEL 2

The library is located on Level 2 and is a perfect location to become a school-wide breakout space. This proposal shows strategic punches through the wall separating the library and corridor such that the historic crown molding is preserved. By not entirely

removing walls, the library can function as both a quiet study space as well as a place for students to collaborate in groups on projects. Similar to the first floor, the secondary corridors can also become breakout adjacent to the classrooms.



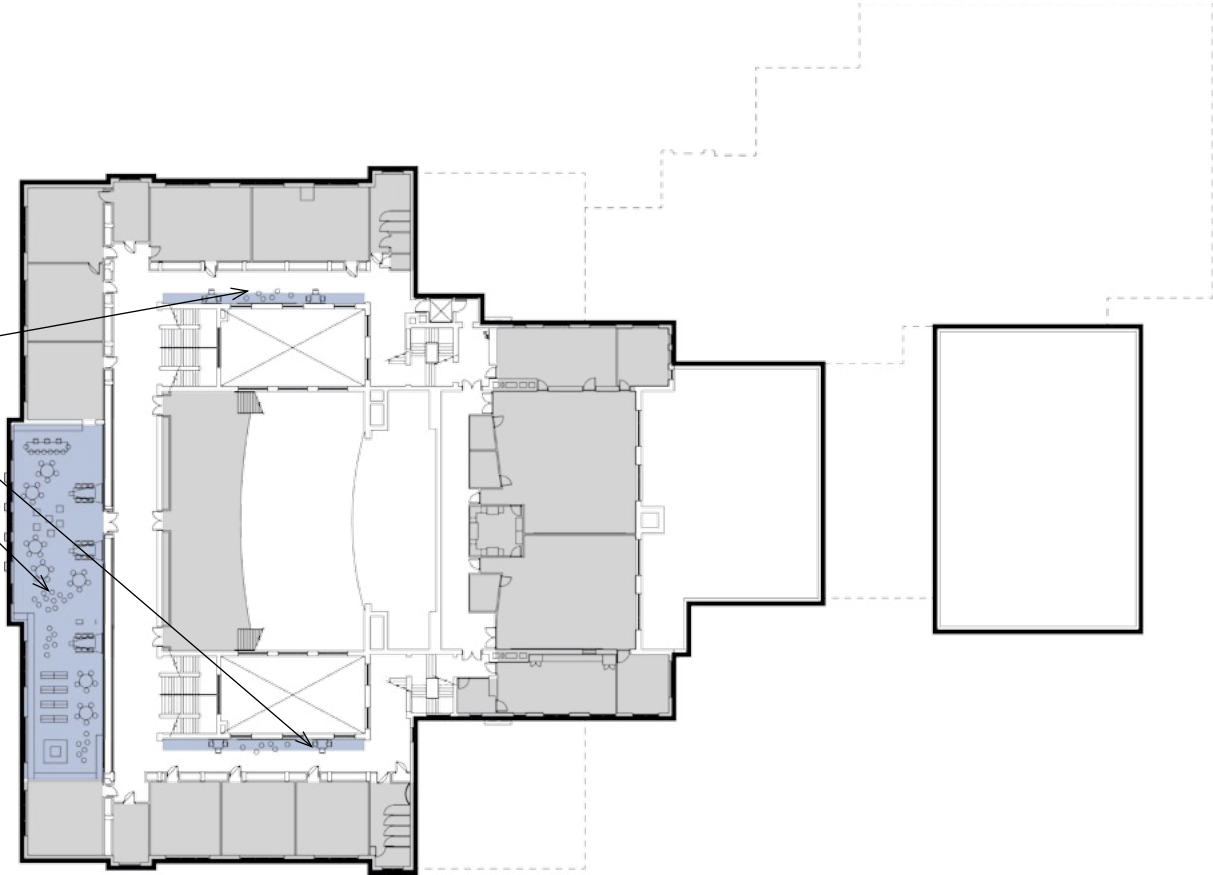
NEW / RENOVATION, LEVEL 2

- NEW CONSTRUCTION
- RENOVATION

SMALL GROUP FLEX SPACE

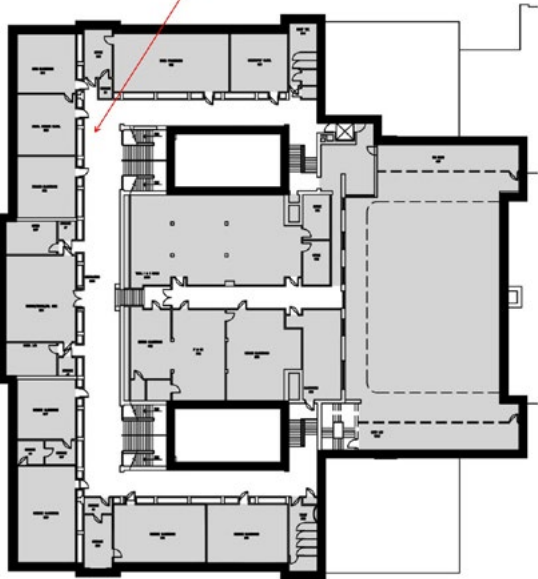
MODERN LIBRARY MEDIA CENTER

- LEVEL 2 PROPOSED**  N
-  RENOVATED SPACES
 -  COLLABORATION (renovated)



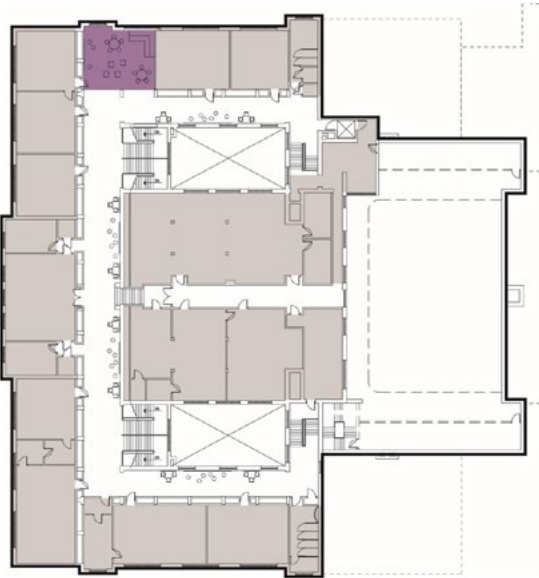
Liberty Memorial Central Middle School

SCHOOL LACKS STUDENT
COLLABORATION + IN-CLASS
BREAKOUT SPACE



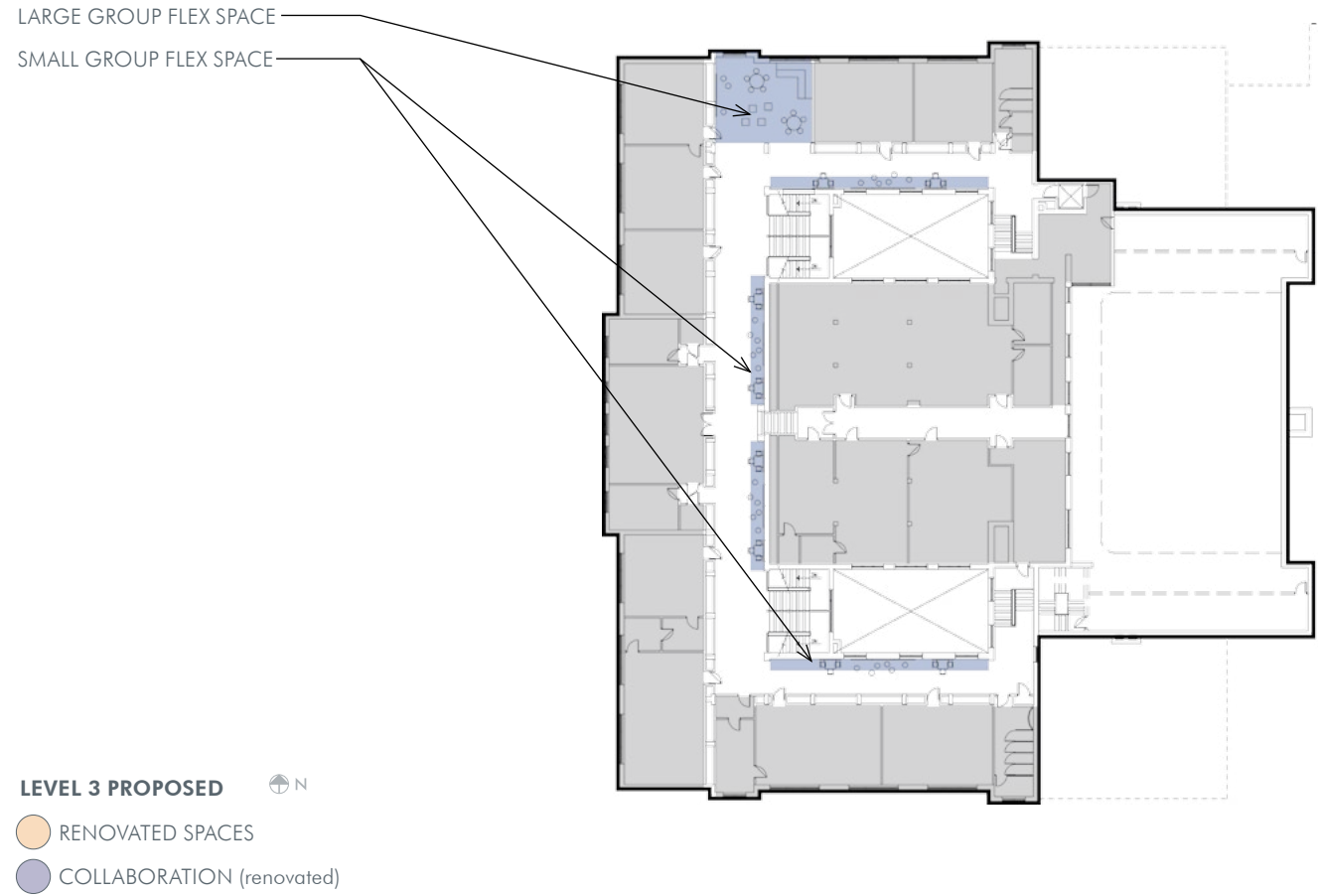
NEEDS ADDRESSED, LEVEL 3

On Level 3 an oversized computer lab, if right-sized, provides a large breakout pocket. This ensures that all levels have at least one large breakout spot. Similar to Levels 1 and 2, converting secondary corridors to small group breakout allows for collaboration to occur directly adjacent to the classroom.



NEW / RENOVATION, LEVEL 3

- NEW CONSTRUCTION
- RENOVATION

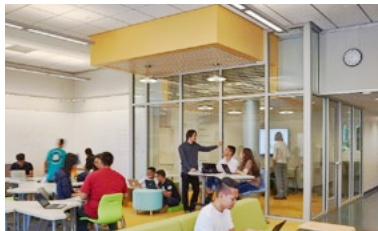


Liberty Memorial Central Middle School

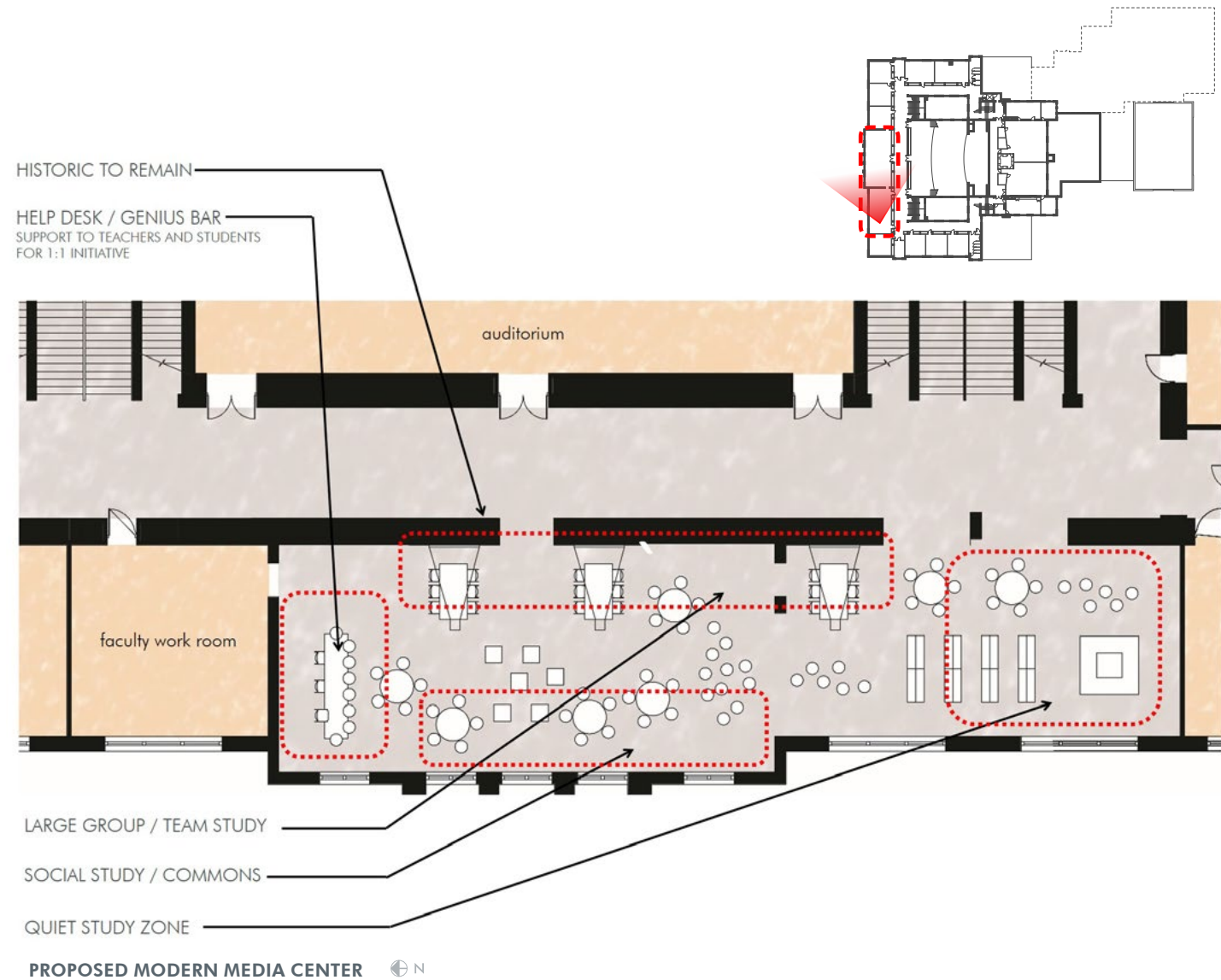
This enlarged floor plan of the modern media center at LMCMS begins to highlight some of the major components being implemented in the space. Included is a help desk (like the Apple Genius Bar) that can house the librarian, an IT specialist, and a student helper to provide tech and device troubleshooting to students and faculty; a mixture of collaborative “social study” spaces for groups to meet, as well as quiet heads-down study zones for prolonged periods of study or private time for students and faculty; and areas scattered throughout dedicated to book stacks.



LMCMS EXISTING LIBRARY



STUDY COMMONS



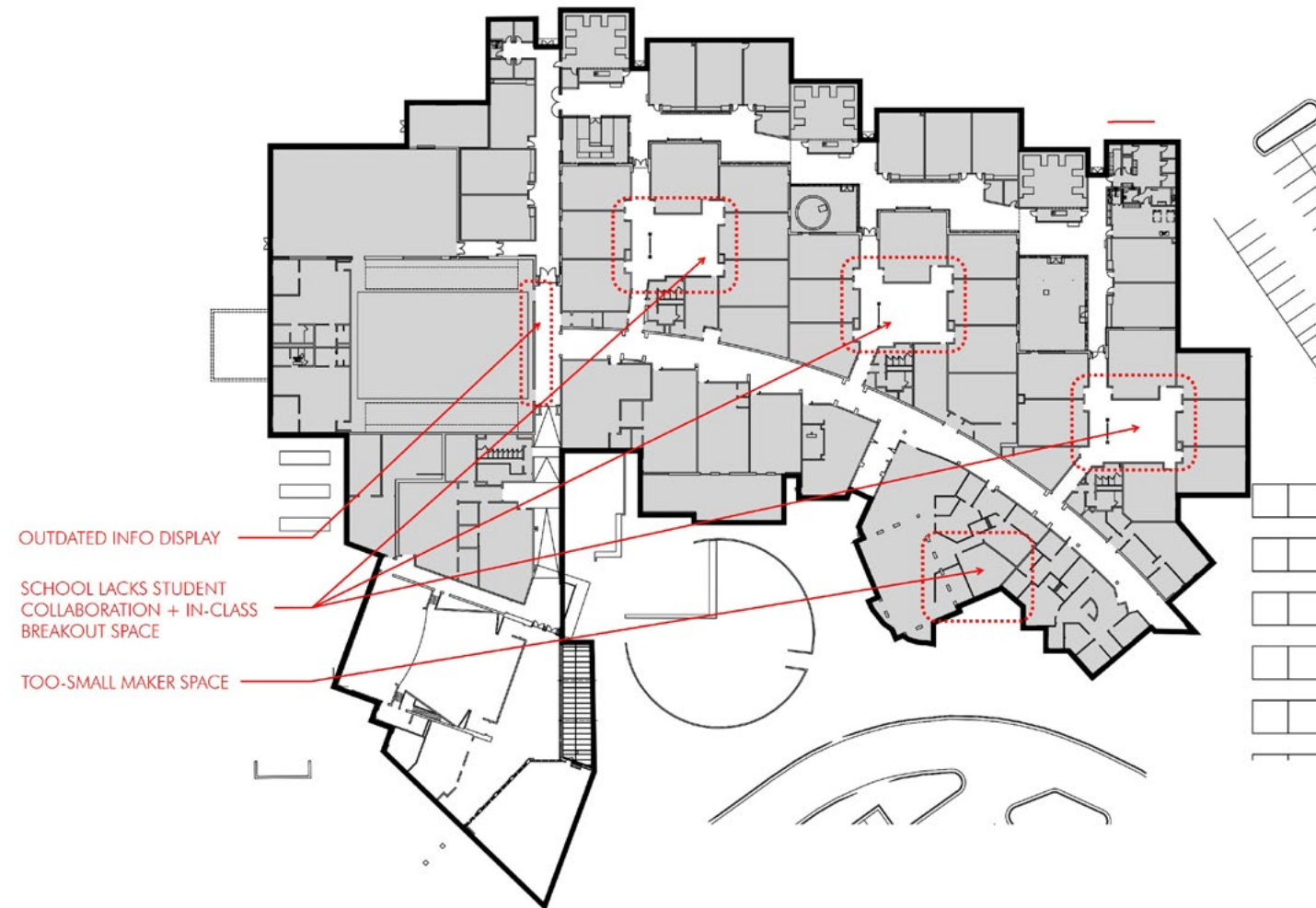


LIBERTY MEMORIAL CENTRAL MIDDLE SCHOOL MODERN MEDIA CENTER

Southwest Middle School

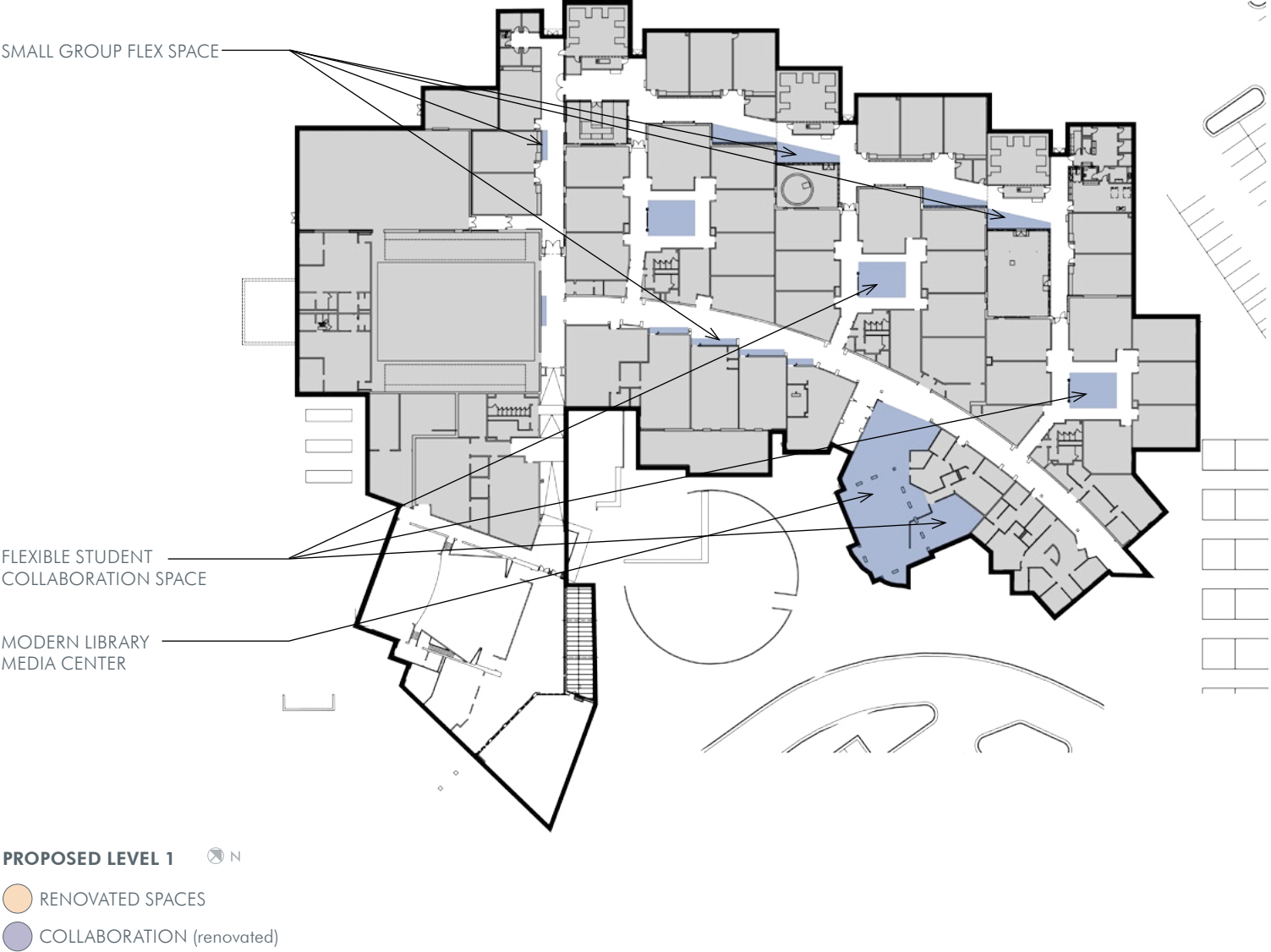
Southwest Middle School was built in the 1990s. Being one of the newer middle schools, this building is receiving minor renovations to support the 21st century learning that is already beginning to occur.

Most notably, proposed is removing a wall in the library to enlarge the existing makerspace; providing furniture solutions for collaborative student breakout in each grade's pod; and updating the school information display.



NEEDS ADDRESSED, LEVEL 1





South Middle School

South Middle School is the newest middle school in the district, being built in the 2000s, and proposed are minor renovations to support the 21st century learning that is already beginning to occur.

Proposed renovations include removing the wall separating the library from the corridor and the multipurpose room from the corridor to open these spaces up and encourage breakout within; and providing furniture solutions that encourage collaborative breakout in the corridors.





**MEP,
ENERGY +
SUSTAINABILITY**

EXISTING MEP ASSESSMENT + RECOMMENDATIONS

LST Consulting Engineers, PA, and Henderson Engineers, Inc., conducted thorough system assessments of all middle schools and high schools, respectively. These reports, in conjunction with energy modeling and information gathered from walkthroughs with USD 497 facilities personnel, were used to prioritize MEP improvements, and associated costs, for each school.

MEP Priorities

Liberty Memorial Central MS

	Life Safety	Priority 1	Priority 2	Priority 3	Comments
Division 22 Plumbing					
Replace Building Domestic Waters Heaters		X			
Replace Domestic Water and Fire Protection Line Backflow Preventors		X			
Replace Galvanized Water Piping from Mech Room to 1954 Gym Add'n		X			
Provide potable drinking water at athletic fields		X			
Age of original waste piping a concern		X			
Division 23 Heating, Ventilating & Air Conditioning					
Replace 1994 Outdoor Air Units				X	
Division 25 Integrated Automation					No new DDC control work identified
Division 26 Electrical					
Replace 1954 panel boards in Girls LR and Gym (3 total)		X			
Install Emergency/Isle Lighting in Auditorium	X				
Replace Lamps in Auditorion House Fixtures with Long Life Source			X		
Replace/Relocate Light Fixtures in Stairs			X		
Replace Lamps in Exterior, Decorative Fixtures			X		
Consider Interior Fluorescent Lighting Replacement to LED				X	
Division 27 Communications (PEC)					
Division 28 Electroninc Safety & Security					
Replace Fire Alarm System with New Voice Notification System	X				

	Life Safety	Priority 1	Priority 2	Priority 3	Comments
Division 22 Plumbing					
Replace Building Domestic Water Heater		X			
Provide potable drinking water at athletic fields		X			
Waste piping buried insode walls in "Home Ec" areas has failed			X		
Division 23 Heating, Ventilating & Air Conditioning					
Major (Building Wide) HVAC Replacement (VRF, Water Source HP, etc.)		X			\$1.6 - \$ 2.3 million (RTU vs. VRF) from LST 12/2013
Repair/Replace Duct Board in Auditorium		X			
Repair/Anchor HVAC & Plumbing Piping in Tunnels		X			
Division 25 Integrated Automation					New DDC controls will be provided as part of the new HVAC systems.
Division 26 Electrical					
Consider Interior Fluorescent Lighting Replacement to LED				X	
Division 27 Communications (PEC)					
Division 28 Electroninc Safety & Security					

MEP Priorities

Southwest Middle School

	Life Safety	Priority 1	Priority 2	Priority 3	Comments
Division 22 Plumbing					
Provide potable drinking water at athletic fields					
Division 23 Heating, Ventilating & Air Conditioning					
Division 25 Integrated Automation					
Replace Pneumatic Controls with DDC in 1994 Classroom Add'n			X		
Replace all pneumatic VAV and FCU controls with DDC			X		
Division 26 Electrical					
Replace/Retrofit Fluorescent Down Lights with LED				X	
Consider Interior Fluorescent Lighting Replacement to LED				X	
Replace Generator/Transfer Switches if not Part of Current Project		X			\$80,000 (from 2/2016 McCown Gordon alt bid)
Replace Auditorium House Lighting			X		
Relocate Auditorium Spot Lights		X			School district has a proposal from Theatrical Services (Tom Johnson) to do this work
Division 27 Communications (PEC)					
Division 28 Electroninc Safety & Security					
Replace Fire Alarm Devices with New and Install Speakers	X				

	Life Safety	Priority 1	Priority 2	Priority 3	Comments
Division 22 Plumbing					
Provide potable drinking water at athletic fields		X			
Division 23 Heating, Ventilating & Air Conditioning					
Division 25 Integrated Automation					
Replace room sensor with sensors with local adjustment capability			X		
Add DDC controls to sections of finned tube that have no controls			X		
Division 26 Electrical					
Replace High Area Light Fixtures with Long Life Source (LED)			X		
Consider Interior Fluorescent Lighting Replacement to LED				X	
Replace Parking Lot Area Lights				X	
Division 27 Communications (PEC)					
Division 28 Electroninc Safety & Security					
Replace Fire Alarm System with New Voice Notification System	X				

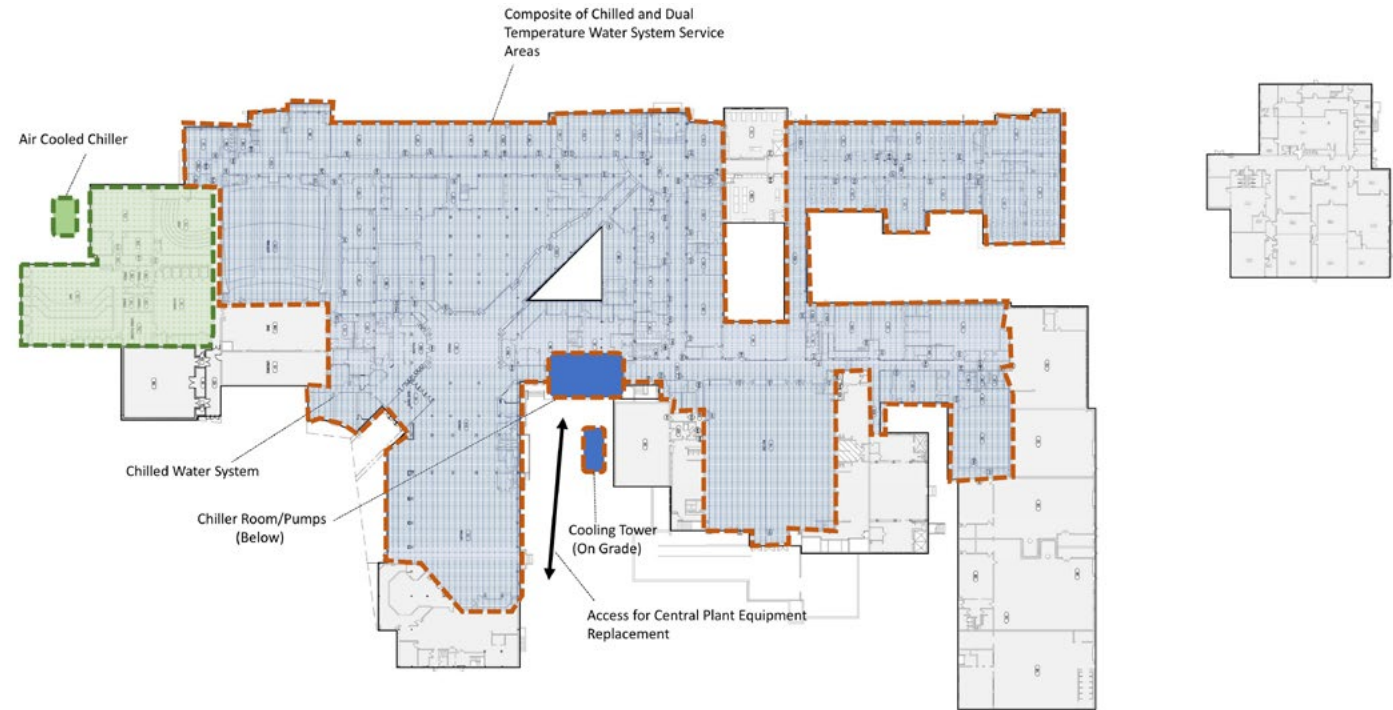
Existing MEP
Cooling System - Central Equipment

WATER-COOLED CHILLED WATER SYSTEMS

- 1. There are three (3) Trane RTHB-150 water-cooled rotary chillers. The chillers operate using R-22 refrigerant.
- 2. The chillers were installed during a major system renovation in 1994. Rotary chillers have an expected service life of approximately 20 years, as published by ASHRAE. The existing chillers have been in use for nearly 20 years but appear to be in excellent condition and have been well maintained. Replacement at this time is not recommended. The system should be reevaluated in 5-10 years.
- 3. Each chiller has a nominal capacity of 150 tons.
- 4. These chillers are located in the boiler room. The chillers are served by dedicated condenser water pumps. The cooling tower serving the chillers was installed in 2011 and is operating in very good condition.
- 5. The chillers are interconnected with the heating hot water system to provide chilled water to the dual temperature hot/chilled water loop.
- 6. The building operating personnel have stated that the chilled water system has performed adequately and that there appears to be excess capacity for future expansion.

RECOMMENDATIONS

- 1. The chillers have been well maintained and are in excellent condition.
- 2. Building operating personnel have stated that the refrigerant monitoring system may not be functional. It is recommended that the system be tested to determine that it operates as required.
- 3. The system should be reevaluated in 5-10 years.

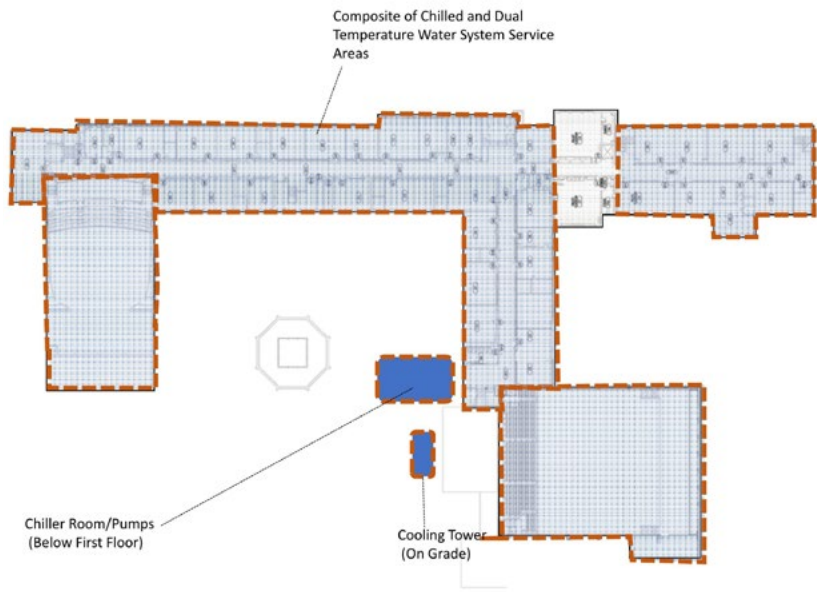


LAWRENCE HS, LEVEL 1

Existing MEP
Cooling System - Proximities

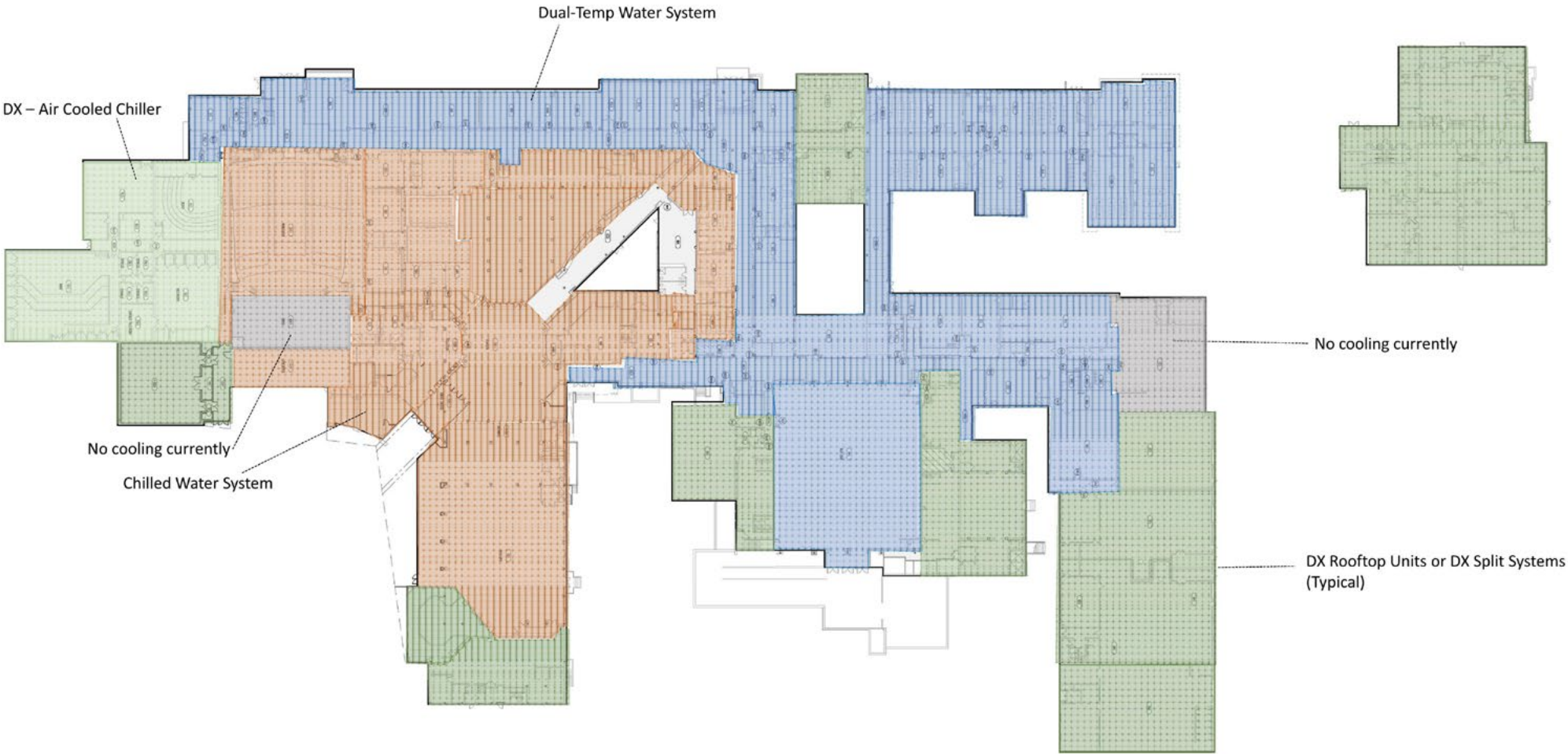
AIR-COOLED CHILLED WATER SYSTEMS

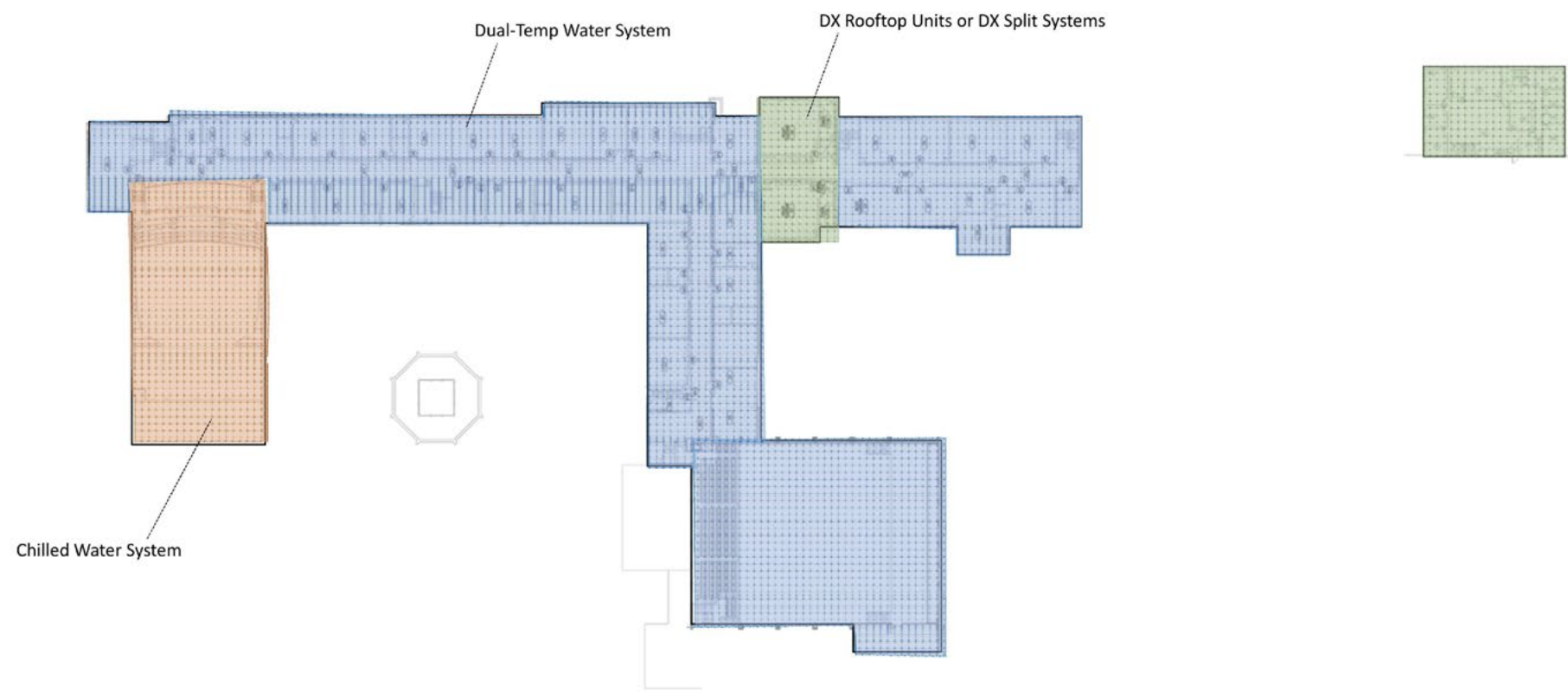
- 1. A McQuay AGZ085 air-cooled chiller is located on the east side of the building located on grade surrounded by a brick screen wall. Owner reports that brick screen wall clearance to unit is right at the minimum distance. Unit operation or performance has had no noticeable effect according to owner. This unit serves the band, orchestra, and choir.
- 2. The unit has a nominal capacity of approximately 80 tons.
- 3. Chilled water from this system is pumped through an in-line pump to serve two rooftop Seasons4 multizone rooftop units. The approximate capacity of these two units total 60 tons.
- 4. The air-cooled chiller is in good condition. As part of masterplan, consideration will be given to providing added cooling to the auditorium stage area. Extra chiller capacity may be available for this purpose.



LAWRENCE HS, LEVEL 2

Existing MEP
Cooling Subsystem - Service Areas





LAWRENCE HS, LEVEL 2



Existing MEP
Steam System - Areas Served

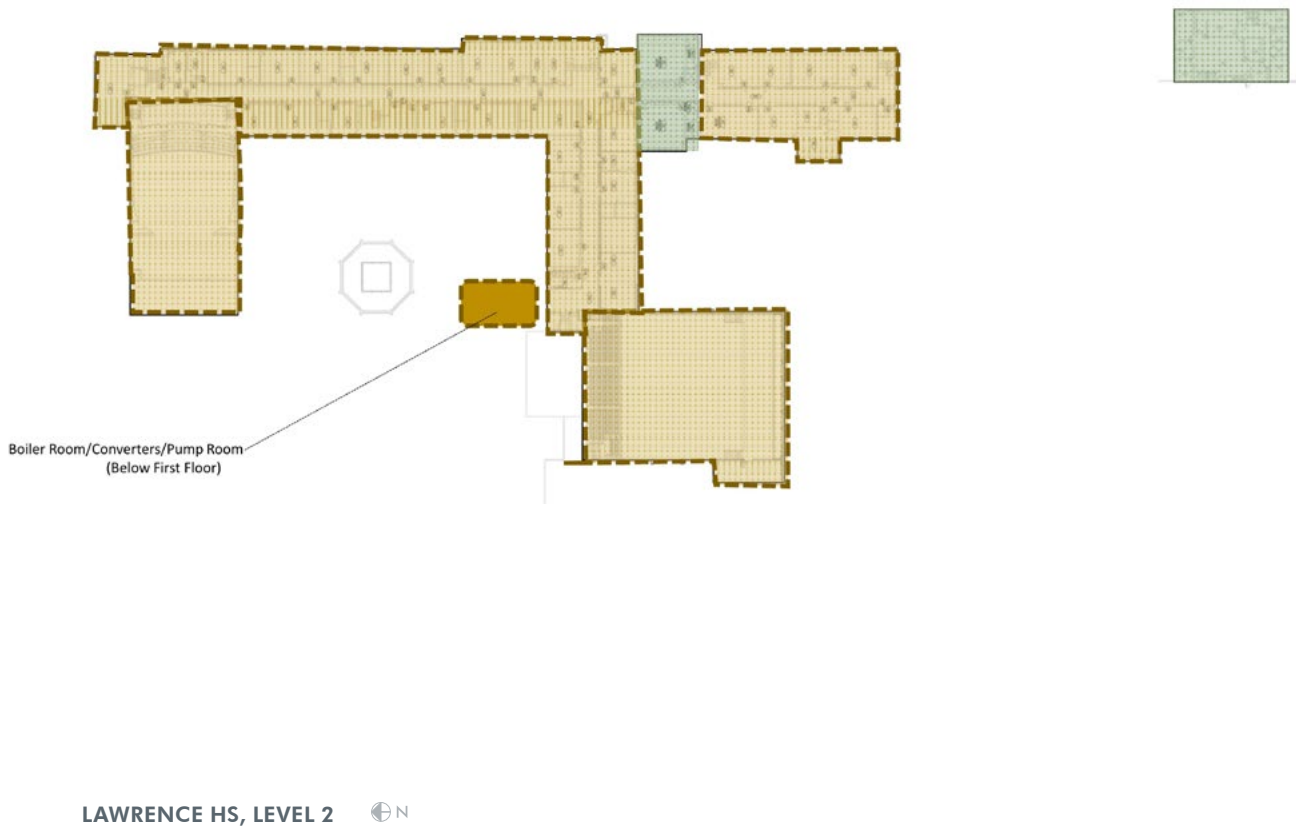
BOILER SYSTEMS

- 1. There are three (3) Weil McLain 1688 steam boilers located in the boiler room, installed in 1995. The boilers provide low-pressure steam to serve the domestic hot water system, three steam-to-heating hot water convertors. One convertor provides heating hot water to serving two air-handling systems (AHU-2 and MZU-3). Two additional heat exchangers provide heating hot water to the dual-temperature hot/ chilled-water loop. The boilers also serve steam heating coils in four (4) air handling units (AHU-1, MZU-1, MZU-2, and the auditorium AHU).
- 2. This type of boiler has an expected service life of approximately 25-30 years as published by ASHRAE. The boilers are in good condition and have been well maintained.



RECOMMENDATIONS

- 1. The boilers are in good condition and have been very well maintained. Owner reports that they have been very pleased with the operation and manufacturer quality. The system should be reevaluated in 5-10 years.



HYDRONIC PIPING SYSTEMS

There are three types of piping systems in the building: Chilled water, heating hot water, and dual-temperature hot/chilled water.

Chilled Water System:

Chilled Water Pump #1, located in the boiler room, is dedicated to distributing chilled water only. This pump serves chilled water cooling coils in AHU-1, AHU-2, MZ-1, MZ-2, MZ-3 and the auditorium AHU. All chilled-water coils are controlled by three-way control valves.

Heating Hot Water System:

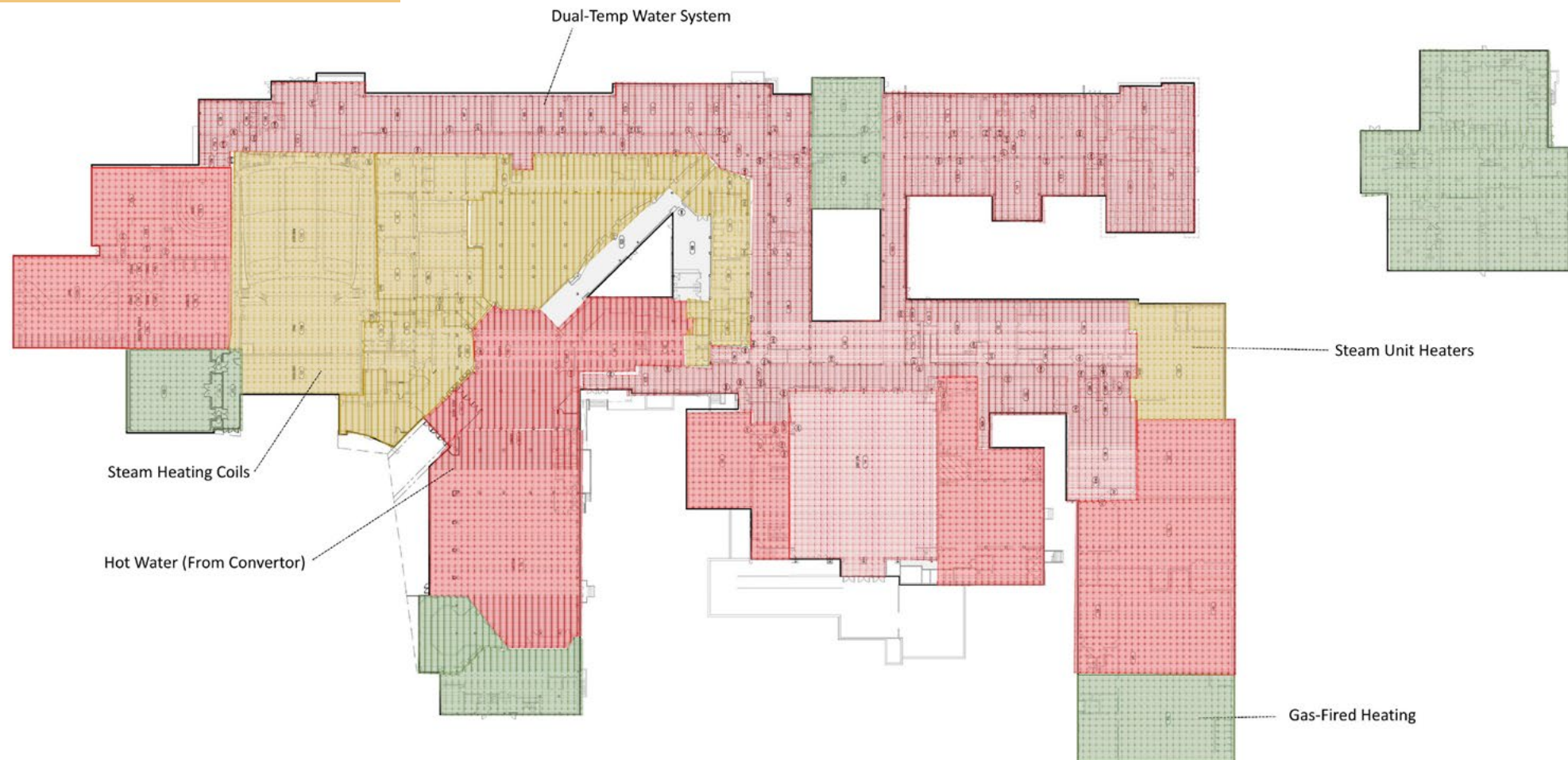
A steam-to-hot water heating converter is located near the boilers. This converter is quite old. It provides heating hot water to AHU-2 and MZ-3. The heating hot water pump that circulates the heating hot water from this convertor to the units is in poor condition and should be replaced.

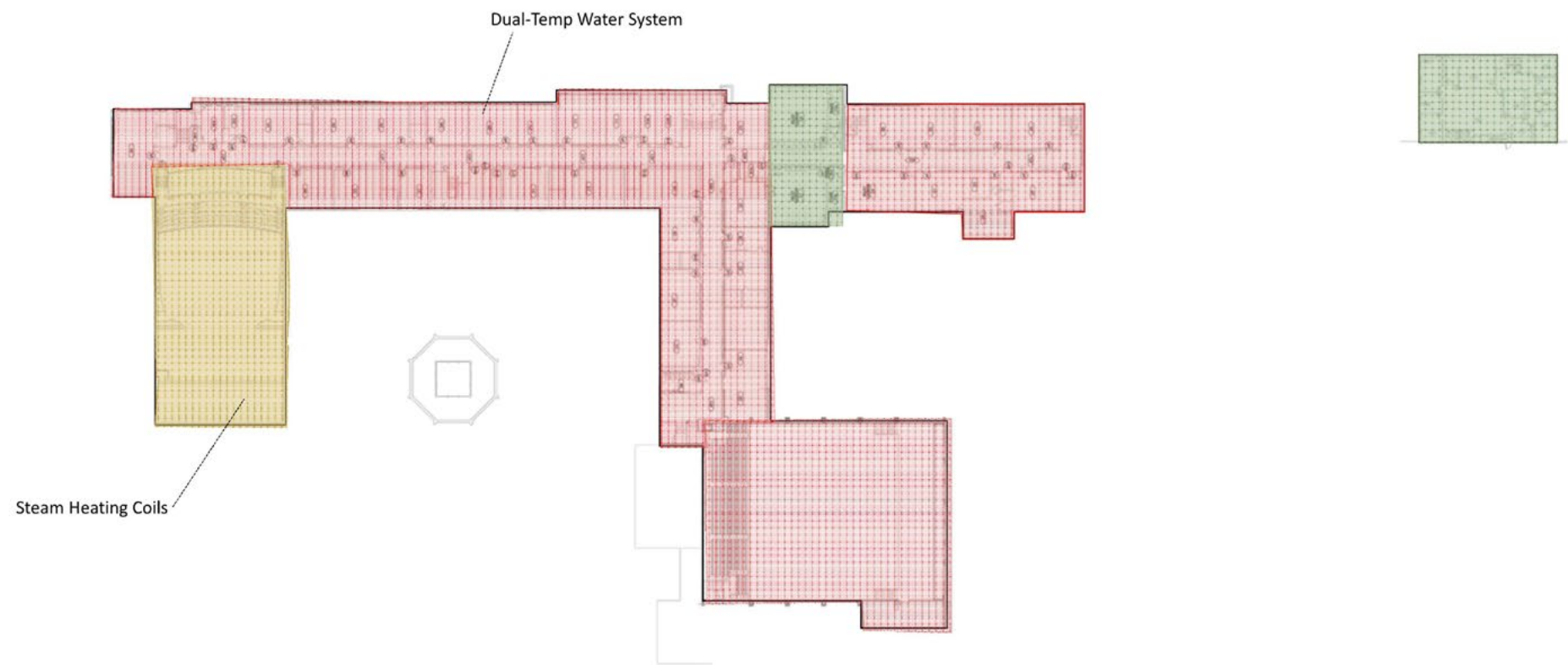
Dual-Temperature Hot/Chiller Water System:

Two steam-to-hot water heating converters are located in the Boiler Room near the water-cooled chillers. These converters were installed in 1994 and are in good condition. They provide dual temperature hot/chilled water to unit ventilators located throughout the building. Chilled/hot water pumps 1 and 2 circulate this water to the system.

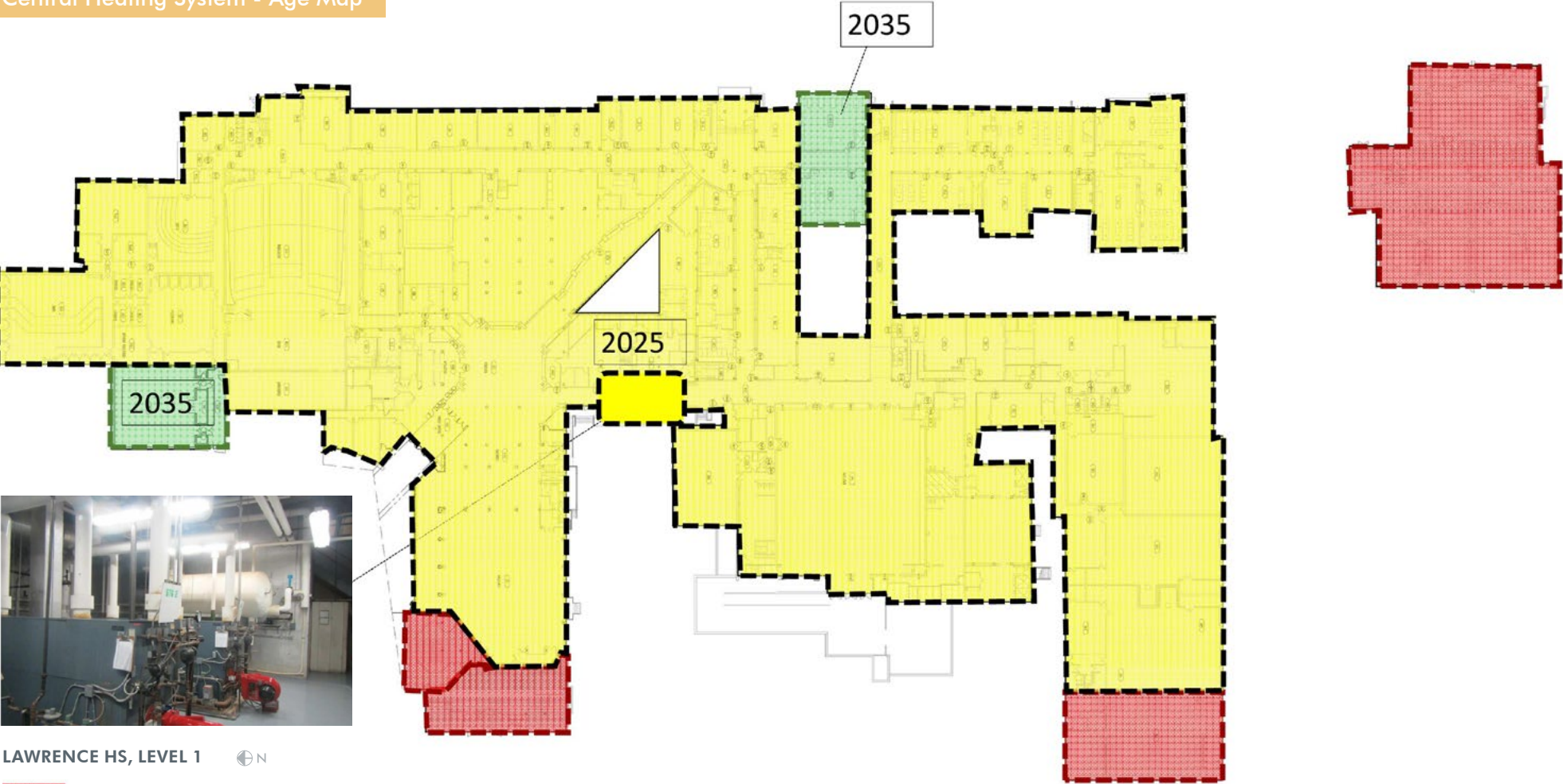
The heating hot water pump serving AHU-2 and MZ-3 was replaced as part of 2014-2015 project.

Existing MEP
Heating Subsystem - Service Areas

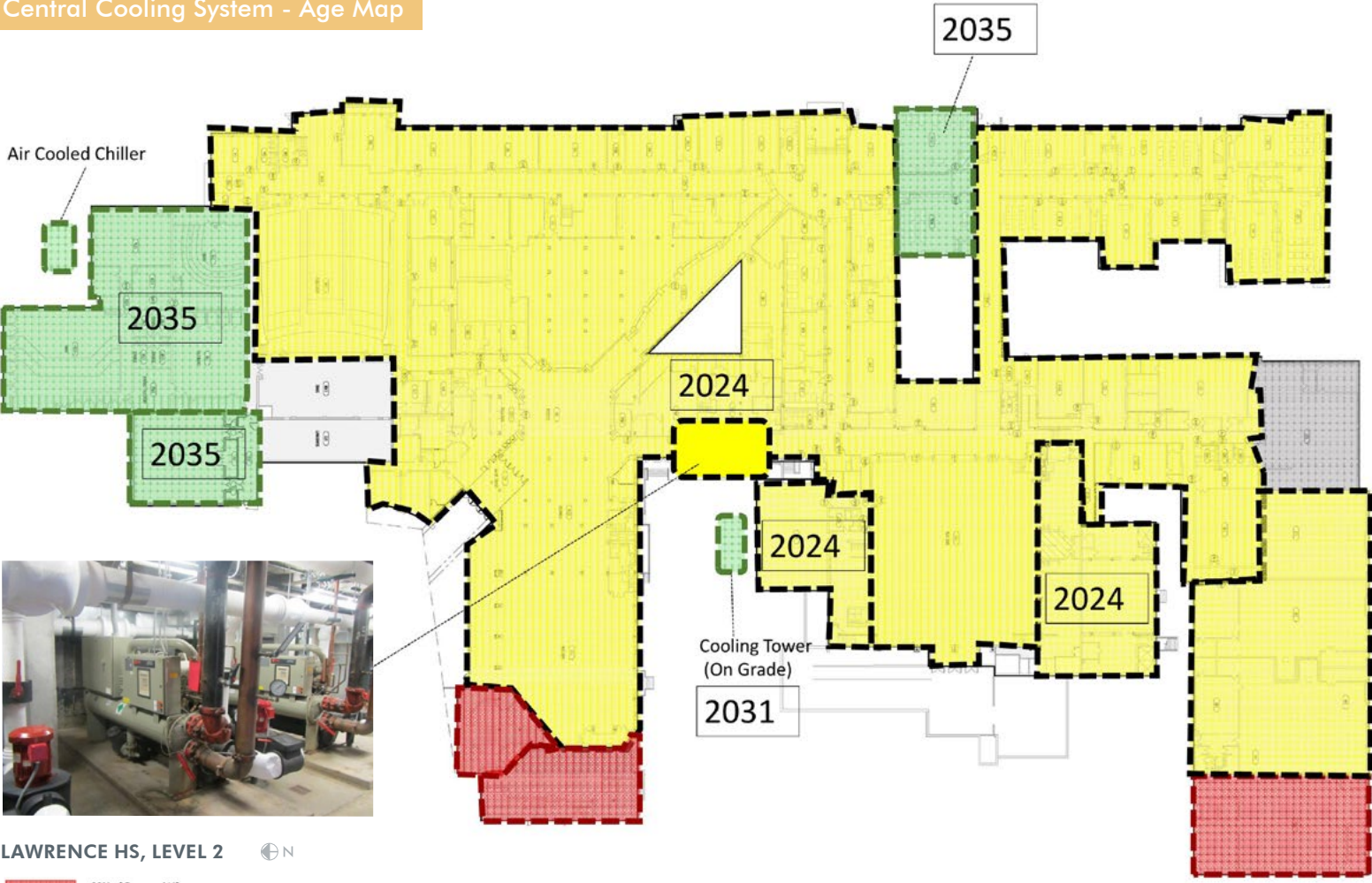




Existing MEP
Central Heating System - Age Map



Existing MEP
Central Cooling System - Age Map



LAWRENCE HS, LEVEL 2

- >90% of Expected Life
- 10-90% of Expected Life
- <10% of Expected Life

Anticipated Replacement
Dates shown on plan

Existing MEP LHS Air Handling Systems

CENTRAL STATION TYPE

1. There are six primary central station type units: AHU-1, AHU-2, MZ-1, MZ-2, MZ-3 and the Auditorium AHU. Each unit has a chilled-water cooling coil with a three-way control valve. The control valve modulates the flow of chilled water to the coil as required to maintain the scheduled leaving air temperature. A constant volume of water is delivered to each air-handling unit. In order to maintain the unit leaving air temperature, the actual flow to the coil is modulated. Water not delivered to the coil is bypassed by the three-way control valve back to the return side of the system. As a result, the energy consumed by the chilled-water pump remains fairly constant, whether full flow is required or not.
2. Two of the units (AHU-2 and MZ-3) contain heating hot water coils. These coils have three-way control valves that operate in the same manner as described above for the chilled-water coils.
3. Four of the units (AHU-1, MZ-1, MZ-2 and the Auditorium AHU) have steam-heating coils. The control valve on the steam supply modulates as required to maintain the required unit-leaving air temperature.

SCIENCE WING ROOFTOP UNITS

1. These units were replaced as part of the 2014-2015 project. Owner reports control issues that will be investigated.

KITCHEN ROOFTOP UNITS

1. There are four gas-fired/DX rooftop units that serve the kitchen and serving areas. These units were installed about 18 years ago (1996-97). Two of the units are used to provide make-up air for the kitchen hoods. One unit provides heating and cooling for the kitchen. One unit provides heating and cooling for the serving area.
2. It was reported that the unit for the serving area has had difficulties keeping up with the load occasionally. In the past, that was due to high heat loads from the grille and pizza ovens. The grille and pizza ovens are no longer in use and that has alleviated the situation somewhat.
3. Recommendations: Based on the age of the units, it is recommended that they be replaced.

EAST GYM SYSTEMS

1. Locker rooms, weight rooms: This area is served by two McQuay indoor units with DX cooling coils and hot-water-heating coils. Heating hot water is generated from a steam-to-water converter and is circulated to the coils by two inline pumps. An Energy Recovery Unit is installed on the roof to pretreat the outside air to the units serving the boy's locker room. These units are in very good condition. These units were installed about 10 years ago.
2. Gym: Two Aaon 60 ton rooftop units serve the gym. The units include a dual-temperature hot/chilled-water coil and a heat recovery wheel. These units were installed about 10 years ago.

VO-TECH WING

1. This area is served by a Seasons4 multizone rooftop unit. The unit is in good condition.

TECHNOLOGY

1. This area is served by rooftop units, one 4-ton unit and one 6-ton unit. The units have DX cooling and gas heat. The units appear to be in good condition.

WOOD SHOP

1. The wood shop is served by a split system with DX cooling and gas heat. In addition, there are 3 gas-fired radiant tube heaters to provide additional heating. One of the heaters was recently replaced.

PHOTO LAB

1. A very old cooling-only split system serves this area. Consideration should be given to replacing this unit (approximately \$10,000).
2. Steam unit heaters provide heating in the area. Consideration should be given to replacing these units and providing heating as part of a new system.
3. A new cooling only units serves the dark room.

AUTO SHOP

1. Steam unit heaters provide heat for this space. There is no cooling provided in the shop. The automotive classroom has a window air conditioner.

WEST GYM/ POOL

1. A new domestic hot water boiler for the west gym was provided as part of the 2014-2015 project.
2. The pool water is heated using a Laars boiler. This boiler was installed in 2009 and is in good condition.
3. Space heating for the pool area is provided by a heating and ventilating-only air-handling unit with face & bypass damper control. The unit has Q-Dot energy recovery coils to transfer heat from air being exhausted to the supply air stream.
4. Heating hot water to the pool air-handling unit is provided by an Ajax 50 Hp boiler. This unit was installed about 15 years ago and is in good condition.
5. It was reported that there have been issues with snow blowing in through the combustion air intake louver. It is noted that the combustion air for the boiler room is not installed in accordance with the building codes. Consideration should be given to upgrading the combustion air system.
6. The gym is served by an Aeon DX cooling/gas heating rooftop unit. It was reported that there were issues with the installation that caused leakage around the unit. These issues have been resolved.

CLASSROOM UNIT VENTILATORS

1. A majority of the classrooms in the building are served by 2 pipe unit ventilators. There are approximately 60 unit ventilators in the school. The total capacity of the units is approximately 250 tons. The unit ventilators have dual-temperature hot/chilled-water coils and have the capability to provide minimum outside air to the spaces.
2. A recurring issue that is reported on almost all older unit ventilator projects is failure of controls. This school is no exception. While the units have the capability to maintain space temperatures, there have been reported control issues.

Replacement Options:

1. Controls replacement: The existing unit controls are pneumatic. The controls on the units could be replaced and converted to DDC. The approximate cost for this work would be \$250,000.
2. Direct replacement: The existing units could be removed and replaced with new units with DDC controls. The units would be installed in the same locations as the existing units. The approximate cost for this work would be \$600,000.

NOTE: Since the installation of these units in 1994, the minimum ventilation requirements have been revised to require a greater amount of outside air be delivered to the occupied spaces. Typically, this is approximately 33% outside air for each classroom. The direct replacement of the unit ventilator with a similar size and capacity unit may not be capable of conditioning this quantity of ventilation air.

3. Replacement of unit ventilators with packaged heat pumps and dedicated outside air system: As mentioned, the unit ventilators are connected to a two-pipe dual-temperature hot/chilled-water loop. The loop water is mechanically cooled and heated by rotary chillers and steam boilers.

As more service life is added to the existing systems in the building, equipment such as chillers, boilers and pumps will be facing the end of their useful life. (See recommendations for chiller and boiler evaluations). As this time approaches, an option for replacement of the unit ventilators with water-source heat pump equipment and dedicated outdoor air systems may be considered a viable alternative. Water-source heat pumps circulate tempered water throughout a loop to serve the heat pumps. In typical hydronic heating and cooling systems, it is normal to see chilled water temperatures maintained at 45°F and heating water temperatures at 180°F. Water-source equipment is selected to operate using loop temperatures between 68°F and 86°F. These temperatures can be maintained using a fluid cooler (closed loop cooling tower) and a small supplemental boiler. When the water temperature rises above 86°F, water is diverted to the fluid cooler where its temperature can be maintained without the use of chillers. If the water temperature drops below 68°F, the supplemental boiler can add the required heat to the piping loop.

Outside air would be provided through dedicated outdoor air systems. These are also connected to the heat pump water loop. With energy recovery media, the total system becomes very energy efficient.

This system, when compared to conventional two-pipe systems may yield as much as a 30% reduction in the cooling and heating costs. The approximate installation cost for this work is estimated at \$1,750,000.

Existing MEP LHS Systems Analysis

PLUMBING

1. Art room sewer lines have been noted to be in very poor condition and are in need of replacement.
2. The water line from the science area of the main building to the annex is PVC. Consider replacing this water line if the annex remains in the future.
3. Galvanized piping is still in use for both domestic water and some waste piping throughout the building. Galvanized piping is known to fail in both of these applications and should be located and replaced as part of future building upgrades. Galvanized piping has especially been noted under the science wings and within the Annex.
4. The west gymnasium drain lines are in need of replacement.
5. The back flow preventer at the west gymnasium is in need of replacement.
6. The kitchen does not have an exterior grease interceptor. Consider adding an exterior grease interceptor and routing grease waste to the new interceptor.
7. The exterior back flow preventer vaults were noted to flood at various times. Having a permanent sump pump within these vaults would help to keep the vaults operational and safe.
8. The east side of the existing building is noted to have issues with existing downspouts from the roof drainage.
9. The current recommendation is to provide side-mount electronic actuators on any existing or new flush valves. This recommendation can be reevaluated if current cleaning practices within restrooms are modified to avoid spraying of the flush valves.
10. The kitchen water heating system and associated storage capacity were noted to be inadequate. Likely the system is unable to handle dump loads of the kitchen domestic hot water demand. This system should be evaluated and replaced as part of future renovation or addition to the kitchen area.
11. The existing domestic water service to the oldest part of the building does not have a back-flow preventer. Heavy renovation will likely trigger a requirement by the city to provide a back-flow preventer. Shut-off valve quantities and locations are inadequate in this building.

MAIN BLDG DOMESTIC WATER HEATER

1. Main building domestic water heater located in the boiler room and flue was replaced as part of 2014-2015 project.

ELECTRICAL

Existing building has 4 separate services feeding different areas within the building.

1. Existing exterior mounted, enclosed 2500A, 480Y/277V, 3-phase, 4-wire fed from an existing pad-mounted exterior transformer. The main switchboard contains two sections serving the main electrical room and downstream distribution equipment. This service feeds in from the west side of the building.
2. Existing exterior mounted, enclosed 1200A, 480Y/277V, 3-phase, 4-wire fed from the same existing pad mounted exterior transformer. The main switchboard contains a single section serving a low-voltage transformer “cafeteria” in the boiler room and downstream distribution equipment. This service is fed from the main switchboard and enters the building from the west side.
3. Existing exterior mounted, enclosed 1200A, 480Y/277V, 3-phase, 4-wire fed from the same existing pad mounted exterior transformer. The main switchboard contains a single section serving a low-voltage transformer “old building” in the boiler room and downstream distribution equipment. This service is fed from the main switchboard and enters the building from the west side.
4. Existing exterior-mounted, enclosed 800A, 480Y/277V, 3-phase, 4-wire fed from the same existing pad-mounted exterior transformer. The main switchboard contains a single section serving the “fine arts” portion of the existing building.

It was noted by the district electrician while on site, that the main issues occurring in the facility are:

1. Panels are nearly loaded to breaker capacity throughout the facility.
2. Identifying the location where a load is fed from due to panels and schedules not labeled or updated properly.
3. Science room on first floor in the newer addition does not have the necessary quantity of circuits for the classroom needs.

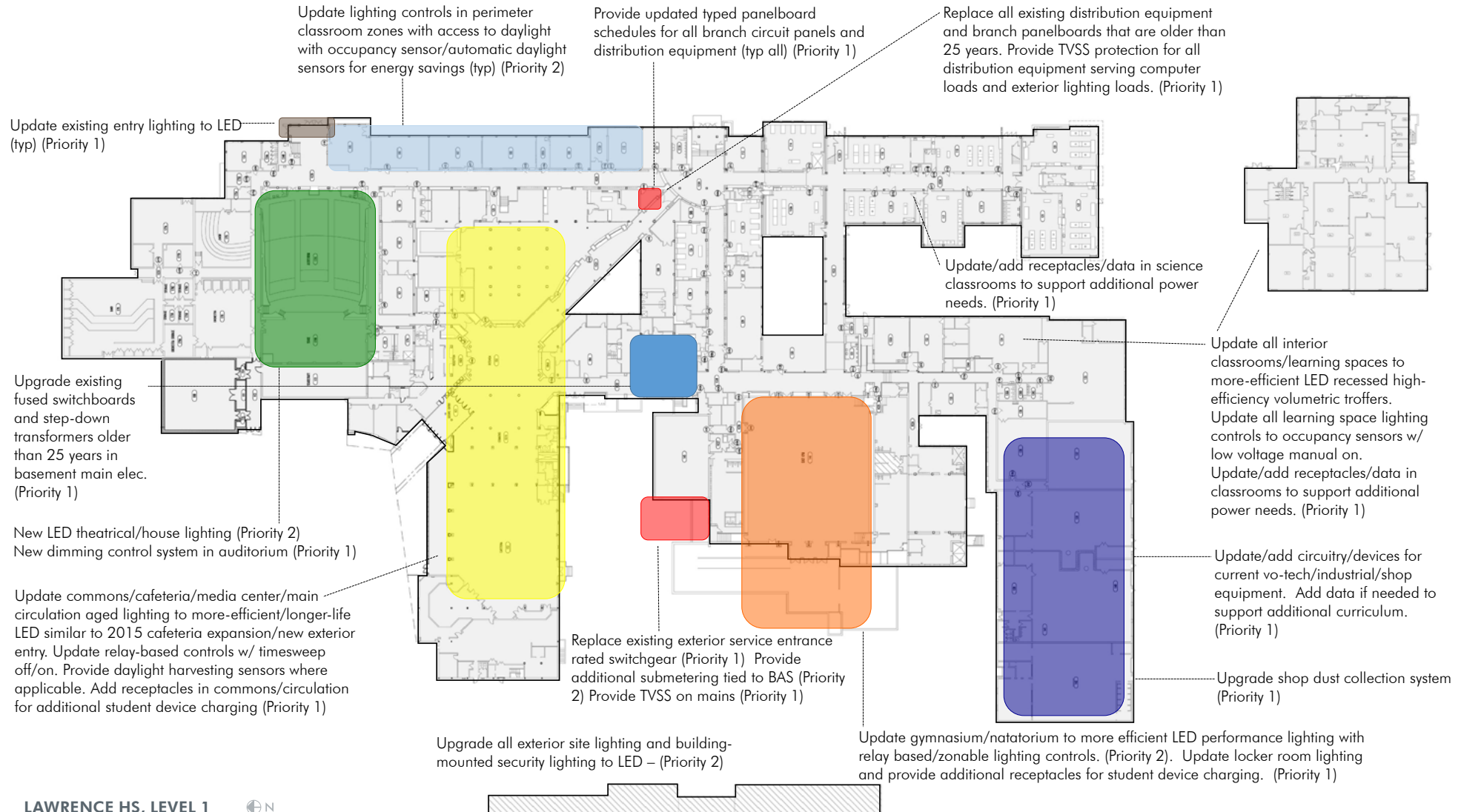
LIGHTING

1. In general, lighting throughout LHS is fluorescent source – T8, 32W or 28W. Fixtures in most areas are 25-30 yrs and older and should be considered for replacement. Fixtures of this age tend to have ballast failures and do not operate as efficiently as more efficient high-efficiency volumetric or LED fixtures on the market today.
2. Controls in most classrooms and educational spaces are toggle switch on/toggle switch off and do not contain occupancy sensors. Spaces that have undergone upgrades have added in occupancy sensors over the years. Overall controls throughout should be evaluated and potentially replaced in areas where fixtures are being replaced to meet current energy codes.
3. Exterior lighting mainly consists of metal halide or fluorescent security lighting and wall packs. Parking lot lighting is metal halide. Exterior fixtures should be considered for upgrade to LED for better efficiency, longer life, and better photometrics to enhance security in these areas.
4. Auditorium dimming system is very old and should be replaced. Auditorium lighting should be considered for replacement with more-efficient, longer-life sources.

ADDITIONAL RECOMMENDATIONS

1. Trace each branch circuit for each panel for all services. Provide typed and updated panelboard schedules and labeling of panelboards, distribution boards, transformers and circuits.

MEP Potential Improvements Lighting/Power



MEP Potential Improvements
Water/Sanitary

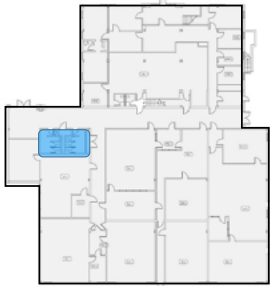
Upgrade water service entry with new backflow preventer

Upgrade original existing galvanized water, sanitary and vent piping infrastructure in science rooms to copper/cast iron



- Replace existing galvanized water piping in masonry walls throughout building
- Replace failing automatic flush valves on existing restroom/locker room fixtures
- Correct arts area sewer backups
- Replace/add electric water coolers/bottle fillers
- Add shutoff valves in major wings to provide better isolation
- Replace west gym drain lines
- Replace existing clay tile piping exterior to the building with cast iron/PVC

Kitchen: New exterior grease interceptor, upgrade water heater and add storage capacity



Replace galvanized water piping and sanitary piping with cast iron in annex

- Add sump pump for backflow preventer at soccer fields

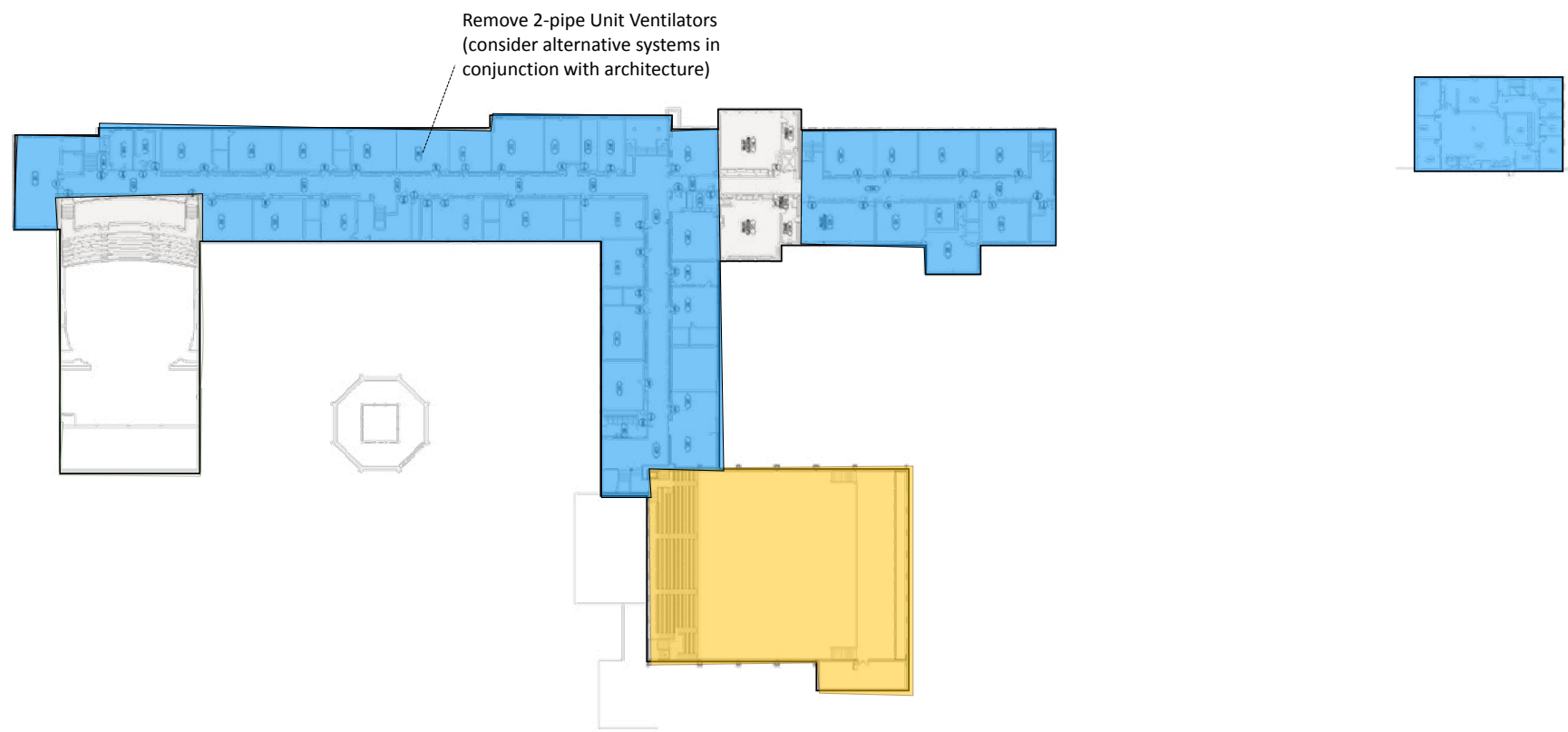
Legend

- Priority 1
- Priority 2
- Work per line items where applicable



MEP Potential Improvements
HVAC





LAWRENCE HS, LEVEL 1

- Priority 1
- Priority 2
- Work per line items where applicable

MEP Priorities Lawrence High School

School	Improvement Item	Maint.	Critical	Energy	Capacity	Priority
	Main Building Central Plant Systems/Infrastructure					
LHS	Replace Condenser Water Pumps (Split-Case Pumps)	X				1
LHS	Refrigerant Exhaust at Chiller Room		X			1
LHS	Replace steam to HW boilers serving heating hot water.	X		X		3
	Replace steam heating coils on AHU-1 (Media), MZU-1 (interior core CR), MZU-2 (Admin), and Auditorium AHU w/ HW coils and new HW piping					
LHS	Replace water-cooled chillers - 3 at 150 tons each.			X		3
LHS	Chilled Water Pumps - replace to add VFD. Change 3 way valves to 2 way at chilled water at existing central units.			X		2
LHS	Hot Water Pumps - replace to add VFD.			X		2
LHS	Replace Galvanized Water Piping (Main Building)		X			1
LHS	Replace Galvanized Waste & Vent Piping @ Science Wing		X			1
LHS	Add cooling at Automotive Shop - either DX or water cooled.				X	1
LHS	Upgrade/Extend DDC controls	X		X		1
LHS	Replace 2-pipe dual-temp loop infrastructure to classrooms.	X				1
LHS	Replace failed automatic flush valves/new fixture sensors in all restrooms.		X			1
LHS	Replace existing exterior service entrance switchgear	X	X			1
LHS	Panelboards - Provide circuit tracking and relabeling of all circuit directories	X				1
LHS	Replace all existing branch circuit panels and distribution equipment that is older than 1987.	X	X			1
LHS	Replace natural gas generator serving life safety loads/back-up loads	X	X			1
LHS	TVSS Upgrades - main service switches, panels serving computer equipment and exterior lighting	X				1
LHS	Upgrade exterior parking lighting to LED	X		X		2
LHS	Add Backflow Preventer at Water Service		X			1
LHS	Add Shut-off Valves in Domestic Water System to provide better wing isolation	X				1
LHS	Add Sump Pump to Backflow Preventer Vaults at south athletic fields		X			1
LHS	Replace existing clay tile piping serving sanitary/storm on exterior of building. Mainly on south. North has been replaced.	1	1			1
LHS	Potential for added submetering to allow for trouble shooting, trending.			X		2
LHS	Central Dust Collector at Wood Shop				X	1

MEP IMPROVEMENT MEASURES SUMMARY

Henderson Engineers, Inc.

School	Improvement Item	Maint.	Critical	Energy	Capacity	Priority
	Distributed Systems in Heavy Renovated Spaces - Main Bldg					
LHS	Replace Classroom 2-pipe unit ventilators with distributed heat pumps (Opt 1) or WC VRF (Opt 2)	X			X	1
LHS	Convert Admin MZU-2 unit to VAV AHU similar to Cafeteria.	x		X		2
LHS	Convert central constant volume single zone air handlers and MZUs serving large areas to VAV - Gym,	X		X		2
LHS	Upgrade interior lighting to newer more efficient LED.	X		X		1
LHS	Lighting Controls upgrades - add occupancy sensors, low voltage switching. Daylight harvesting in some areas.	X		X		1
LHS	Replace Competition Gym Aaon AHUs that are on the dual-temp loop w/ energy recovery. Extend what loop?					2
LHS	Replace Locker Room DX Splits w/ HW cooling coils.					2
LHS	Science Wing new RTUs control retrofit	X	X	X		1
LHS	Kitchen/Servery RTU's - Replace w/ DX/Gas Heating and replace MAU/Exhaust	X		X		1
LHS	Kitchen - Upgrade/Replace Water Heater/Storage				X	1
LHS	Kitchen - Provide new exterior grease interceptor. Reroute existing req sanitary through.		X			1
LHS	Art Area Sewer Backups		X			1
LHS	Additional receptacles in classroom spaces to support curriculum, laptop/ipad charging, etc.				X	1
LHS	Additional data/technology closets/racks to support curriculum				X	1
LHS	Replace/Add Electric Water Coolers with Bottle Fillers	X				1
	Auditorium/Stage					
LHS	Stage/Auditorium Lighting Control System - new theatrical/architectural	X	X			1
	Update AV System in Auditorium	X	X			1
LHS	Upgrade auditorium and stage house lighting and theatrical lighting to more efficient, longer life source (LED)	X		X		2
LHS	Add cooling via FCU at stage in Auditorium. Tie to existing air cooled chiller.	X			X	1
	Annex/Gym/Natorium					
LHS	Replace Backflow Preventer at West Gym					1
LHS	Replace Heating Hot Water Boiler at Natatorium					1
LHS	Natorium Dehumidification		X			1
LHS	Replace West Gym Drain Lines		X			1
LHS	Add Sump Pump to Backflow Preventer Vaults at fields		X			1
LHS	Clay Tile outside of building-replace					1
LHS-Annex	Replace Annex HVAC	X				1
LHS-Annex	PVC Water pipe to Annex					1
LHS-Annex	Replace Galvanized Water Piping (Annex)		X			1

Existing MEP FSHS Systems Analysis

CHILLED WATER SYSTEMS

1. The building is served by four (4) Trane RTAA air cooled reciprocating chillers. The nameplate data on the chillers is faded and not readable. The local Trane office was contacted for assistance in determining the capacities of the chillers.
2. The chillers were installed during the original building construction in 1996. Air cooled reciprocating chillers have an expected service life of approximately 15-20 years, as published by ASHRAE. The existing chillers have been in use for 18 years and are nearing the end of their service life.
3. Chillers 1, 2 and 3 have a nominal capacity of 150 tons. Based on information from Trane, the approximate capacity of these chillers is between 132 and 149 tons. The capacity varies based on leaving chilled water temperature and the outside air ambient temperature.
 - Chiller 1 has a total connected load of 144.8 tons.
 - Chiller 2 has a total connected load of 122.9 tons.
 - Chiller 3 has a total connected load of 124.3 tons.
4. Chiller 4 has a nominal capacity of 300 tons. Based on information from Trane, the approximate capacity of this chiller is between 254 and 273 tons. The capacity varies based on leaving chilled water temperature and the outside air ambient temperature. Chiller 4 has a total connected load of 392.3 tons. This would indicate a shortage in total capacity for this chiller, however, the usage of the spaces vary considerably. Large areas such as the common space, auditorium and gymnasium would normally not be fully occupied at the same time. This diversity may have been taken into consideration in the selection of Chiller 4. However, facility maintenance (FM) staff have noted the chiller has a high number of run hours. Existing trend data should be reviewed if available to confirm whether chiller is operating at peak capacity in peak conditions. The chiller is noted to be used heavily on the weekends as it serves core areas of the building used off-hours. This chiller is grade mounted on the west side of the building. An Aurora base-mounted primary chilled water pump circulates the chilled water to two aurora base-mounted secondary chilled water pumps in the main Mechanical Room. The secondary pumps deliver chilled water to

mounted chilled water pump circulates the chilled water through the chiller, to the air handling equipment and back.

air handling units throughout the west wing of the building. Each secondary pumping loop is independent, with no interconnection between the two secondary system.

5. The building operating personnel have stated in the past that the chilled water system throughout the building is running at its maximum capacity.

RECOMMENDATIONS

1. Given the age of the air-cooled chiller equipment, USD497 should consider planning for the replacement of the chillers within the next 5 years. During the 2014-2015 projects, HEI received the following approximate equipment costs from Trane for the replacement of the chillers:

150-ton Chillers:

\$105,000 for Standard Efficiency
\$130,000 for High Efficiency

300-ton Chillers:

\$210,000 for Standard Efficiency
\$260,000 for High Efficiency

Installation costs will vary depending on the location of the equipment. Grade mounted chillers are less difficult to install. Roof mounted chillers will required hoisting of the equipment onto the roof.

2. Consideration should be given to providing interconnecting piping between the chillers to provide for a primary chilled water loop.

In the event that a chiller goes off-line, the primary chilled water loop would allow chilled water flow to those air handling systems affected and allow the air handling systems to remain operational. Additionally, staging of the chillers to operate only as required to match the building load would result in reduced energy consumption. Each chiller would have a new primary pump installed sized for maximum water flow through its respective chiller with a pumping head capable of circulating through the entire primary loop. Additionally, new secondary chilled water pumps would be installed to draw the chilled water out of the primary loop, deliver it to the air handling equipment and return it to the primary loop.

These chillers are located on the roof of the classroom wing of the building adjacent to the air handling unit penthouses. Each chiller is dedicated to serve four air handling systems. A single Aurora base-

BOILER SYSTEMS

1. There are a total of 23 gas-fired condensing boilers that serve this building. These boilers are located in four areas of the building.
2. This type of boiler has an expected service life of approximately 15-20 years as published by ASHRAE. Eleven original boilers are still in use and are nearing the end of their service life.
3. Fourteen gas-fired condensing boilers are located in the Main Mechanical Room. Twelve are original to the building. Two were installed in 2006. All of the boilers are Hydrotherm Model AM-300. The original boilers have a heating output of 237 MBH. The two newest boilers have a heating output of 272 MBH. Prior to 2014/2015 project, the total plant capacity was 3,388 MBH. The total connected load was approximately 3,630 MBH.

The heating hot water is circulated throughout the system by two Aurora base-mounted heating hot water pumps. Each pump is rated to deliver 325 gpm. The connected load on this system is approximately 375 gpm. Although the connected load is greater than the capacity of a single pump, only one pump operates at any one time.

4. The West Penthouse houses three Munchkin 399M gas-fired condensing boilers. These boilers were installed in 2008. Each boiler has a heating capacity of 371 MBH, for a total of 1,113 MBH. Originally, there were four boilers, but due to the higher capacity of the Munchkin boilers, only three were replaced.

5. The total connected load is approximately 1,109 MBH. The Middle Penthouse houses three Munchkin 399M gas-fired condensing boilers, however only two are operational. These boilers were installed in 2008. Each boiler has a heating capacity of 371 MBH, for a total operational capacity of 742 MBH. Originally, there were four boilers, but due to the higher capacity of the Munchkin boilers, only three were replaced. The total connected load is approximately 1,000 MBH.
6. The East Penthouse houses three Munchkin 399M gas-fired condensing boilers. These boilers were installed in 2008. Each boiler has a heating capacity of 371 MBH, for a total of 1,113 MBH. Originally, there were four boilers, but due to the higher capacity of the Munchkin boilers, only three were replaced. The total connected load is approximately 1,206 MBH.

RECOMMENDATIONS

1. Given the age of the equipment, USD497 should consider planning for the replacement of the original boilers within the next 5 years.
2. Repair/replace non-functional boiler in the Middle Penthouse in the near future. NOTE: The Munchkin boilers installed in the penthouses are no longer manufactured.

AIR HANDLING SYSTEMS

1. There are 24 air handling systems in the building. All except one was installed as part of the original construction in 1996. A new system to serve the Shop Addition was installed in 2006. The units are located in various mechanical rooms throughout the building.
2. The air handling systems are in good condition. With proper maintenance, these units should last many more years.
3. As part of 2014-2015 project one multi-zone unit previously serving admin area was replaced with a VAV air handler in the west penthouse serving 1st floor west classrooms.
4. FM staff noted that MZ-3 has trouble maintaining temperature (confirm in heating?). The problem started with the addition in the southwest corner of the building. A 360 gpm was specified but the pump supplied only delivers 325 gpm.

PLUMBING SYSTEMS

1. The existing water heaters serving the kitchen are original and have far exceed their expected life. These water heaters should be replaced as soon as feasible to avoid failure that would result in shutting down the kitchen for health reasons.
2. Area G (north end of building) mezzanine contains original atmospheric water heaters. The combustion air intake system for this mezzanine has caused freezing conditions at fire sprinkler piping in the past and should be addressed. Installing new, sealed combustion, high-efficiency condensing water heaters is recommended. The combustion air intake should be sealed to prevent entry of outside air into the mezzanine.

Existing MEP FSHS Systems Analysis

ELECTRICAL SYSTEMS

Existing building service is 4000A, 480Y/277V, 3-phase, 4-wire fed from an existing pad mounted exterior transformer incoming on the west side of the building. Main switchboard MSB contains five sections serving distribution equipment within the main electrical room and downstream throughout the facility. A 2500A busduct is fed from MSB which is routed over to Classroom Wing and serves distribution equipment within (3) penthouse units which feed downstream electrical closet on the lower levels of the classroom wing. One branch of the distribution system tapped from the 2500A bus duct feeds a 112.5KVA K-rated transformer which feeds a computer distribution panel (CDP1) and subsequent computer power branch circuit panels serving computer branch circuits within the classroom.

It was noted by the district electrician while on site that the main electrical issues occurring in the past in this facility are the result of the addition of an increasing amount of computer loads within the classrooms. This addition of computer load has essentially maxed out the capacity of the computer distribution board and k-rated transformer originally designed to feed only a limited number of computer loads within the facility. The electrician also indicated that due to the limited capacity of the existing k-rated transformer that a number of recently added computer circuits have been branch circuited to non-computer power panelboards and thus the harmonics of this portion of the distribution system is not ideal.

Based on the site visit, analysis, and discussion with the district's electrician and maintenance staff, HEI has reviewed and offers the following recommendations to be considered in the current construction package:

1. Prior to preparing final contract documents, install a power quality meter (PQM) on the Service Main, 2500A bus and on Distribution Panel CDP-1 for a minimum of 3 school days each, to measure existing conditions and to ensure there are no underlying conditions that are yet to be discovered.
2. Have individual contractor perform manufacturer-recommended service on the bus and wire connections in this branch of power to determine that there are no underlying conditions yet to be discovered.
3. Replace aging surge protection devices/ power conditioning (SPD) in original CP1 – CP4 computer panels with newer, more effective surge protection equipment.
4. Provide new SPD (surge protection device) on Distribution Panel CDP-1 in penthouse.
5. Provide new SPD on Switchboard MSB.
6. Provide new twin 200A fused switch within existing main switchboard MSB in place of single switch feeding existing board WP. Provide new feeder from new switch to a new 112.5KVA, K-rated transformer and distribution panel CDP-2 located at the classroom wing. Provide 3 new computer load branch circuit panelboards (CP2-1 through CP2-3) all with SPDs for rearrangement of existing branch circuiting within classroom spaces and future computer additions. (Work completed in 2014-2015 project)

LIGHTING

1. In general, lighting throughout FSHS is fluorescent source – T8, 32W or 28W. Fixtures in most areas are 25-30 yrs and older and should be considered for replacement. Fixtures of this age tend to have ballast failures and do not operate as efficiently as more efficient high-efficiency volumetric or LED fixtures on the market today.
2. Controls in most classrooms and educational spaces are toggle switch on/toggle switch off and do not contain occupancy sensors. Spaces that have undergone upgrades have added in occupancy sensors over the years. Overall controls throughout should be evaluated and potentially replaced in areas where fixtures are being replaced to meet current energy codes.
3. Exterior lighting mainly consists of metal halide or fluorescent security lighting and wall packs. Parking lot lighting is metal halide. Exterior fixtures should be considered for upgrade to LED for better efficiency, longer life, and better photometrics to enhance security in these areas.
4. Auditorium contains quartz halogen fixtures for show and theatrical lighting which are not efficient. Consideration should be given to upgrade to more efficient sources. Dimming system within the auditorium is in good condition.

MEP Improvement Priorities Free State High School

School	Improvement Item	Maint.	Critical	Energy	Capacity	Priority	Notes
FSHS	Replace Chiller AC-1	X		X		2	
FSHS	Replace Chiller AC-2	X		X		2	
FSHS	Replace Chiller AC-3	X		X		2	
FSHS	Replace Chiller AC-4	X		X	X	1	Runs more than AC-1 through AC-3 from Maintenance Staff perspective
FSHS	Provide primary chilled water loop tying chiller plants together					2	Re: Assessment diagram. Provides better diversity, lengthens run-time
FSHS	Replace 1st Level Main Boiler Plant	X		X		1	Need replaced per district staff.
FSHS	Penthouse Boiler Capacities to allow reheat tie-in at 1st level CRs		X		X	2	Would allow main boiler plant to not be utilized for classroom reheat.
FSHS	Upgrade/Replace Kitchen Water Heaters		X			1	
FSHS	Upgrade/Replace Locker Water Heaters					1	
FSHS	Locker Water Heater Combustion Air		X			3	
FSHS	MZ-3 Heating Temp Maintenance				X	1	

POTENTIAL MEP IMPROVEMENT PRIORITIES

Henderson Engineers, Inc.

School	Improvement Item	Maint.	Critical	Energy	Capacity	Priority	Notes
FSHS	Motor Control Center Switches		X			2	Plastic Disconnects are unreliable and can't be replaced when they fail
FSHS	Main Switchboard		X		X	2	Plastic Disconnects are unreliable and can't be replaced when they fail
FSHS	Lighting Controls upgrades - add occupancy sensors, low voltage switchin	X		X		2	
FSHS	Upgrade exterior parking lighting to LED	X		X		2	
FSHS	Upgrade interior lighting to newer more efficient sources	X		X		2	
FSHS	TVSS Upgrades - upgrade SPDs in existing computer panels	X				1	
FSHS	Additional receptacles in classroom spaces to support curriculum, laptop/i	X			X	2	
FSHS	Potential for added submetering to allow for trouble shooting, trending.	X		X		2	
FSHS	Additional data to support curriculum					2	
FSHS	Auditorium lighting upgrade to more efficient sources	X		X		1	

POTENTIAL ELECTRICAL IMPROVEMENT PRIORITIES

Henderson Engineers, Inc.

ENERGY USE, SUSTAINABILITY + LIFE CYCLE

An existing building analysis was conducted to evaluate future building improvement opportunities. This process involved creating an energy model based on the existing building and then assembling a list of potential building improvement alternatives. The evaluation included looking at energy as well as energy cost impact for each solution.

The existing building was generated based upon site data, existing plans and operations, and conservative engineering judgment around unknown parameters. These savings alternatives, also called Energy Conservation Measures (ECMs) were evaluate both for individual impact as well as “cascading” impact, to evaluate multiple alternatives for improvement.

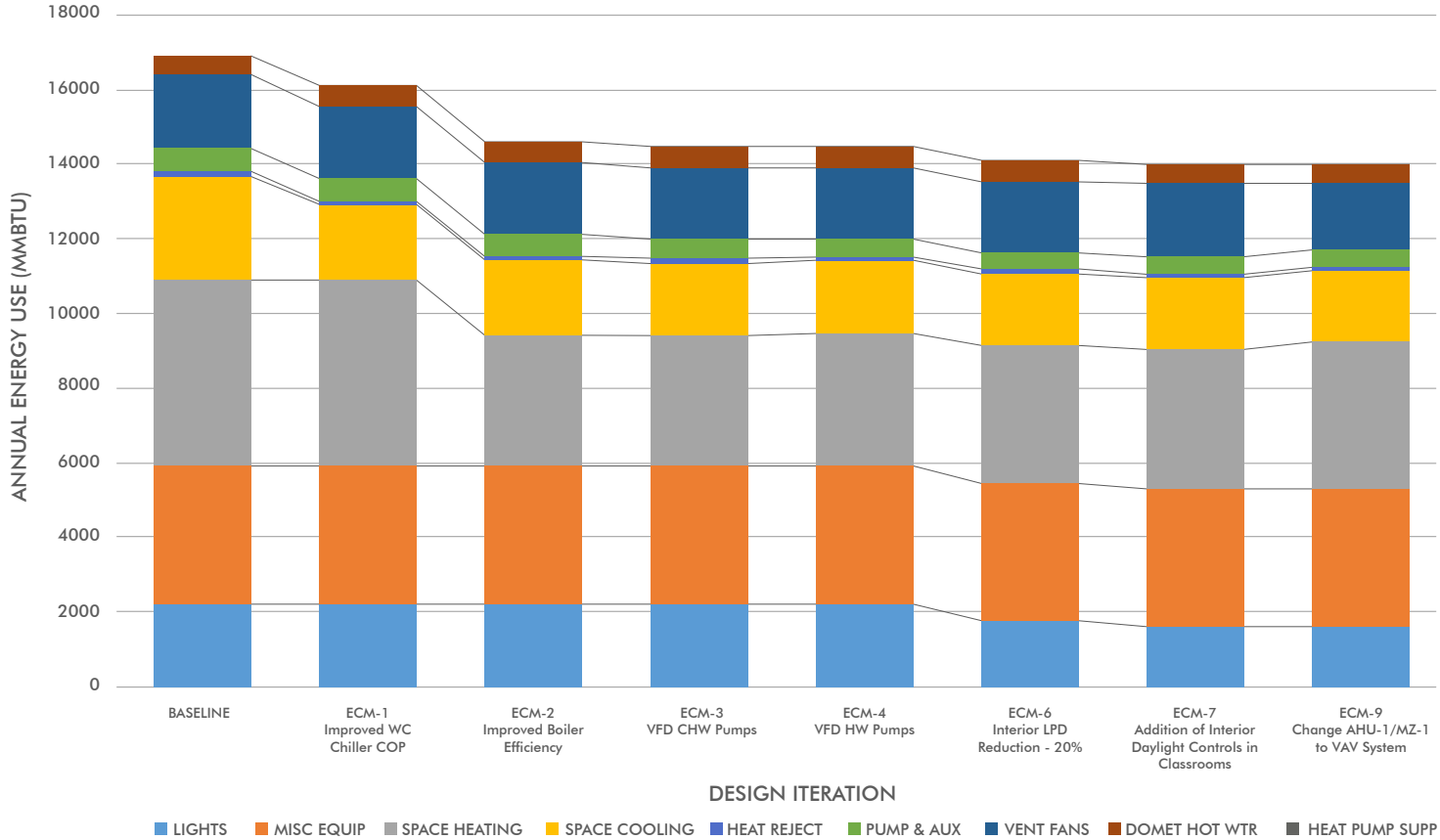
A second set of alternatives were evaluated, which involved the replacement of HVAC systems in all classroom areas with either Water Source Heat Pumps or a Variable Refrigerant Volume System. These iterations were also evaluated with a select group of the building improvements evaluated in the first step. These alternatives include addition of circulation areas east and south of the main building.

The analysis is intended to be used in determining the most effective energy conservation options to be considered as part of the long-range planning for the facility. For individual ECMs, due to the relative costs of electricity and natural gas, resulted in two different alternatives for which would save the most energy vs. the largest energy costs. A replacement of the steam boilers was determined to save the largest amount of energy, but the replacement of the water-cooled chillers was shown to have the largest individual energy cost savings.

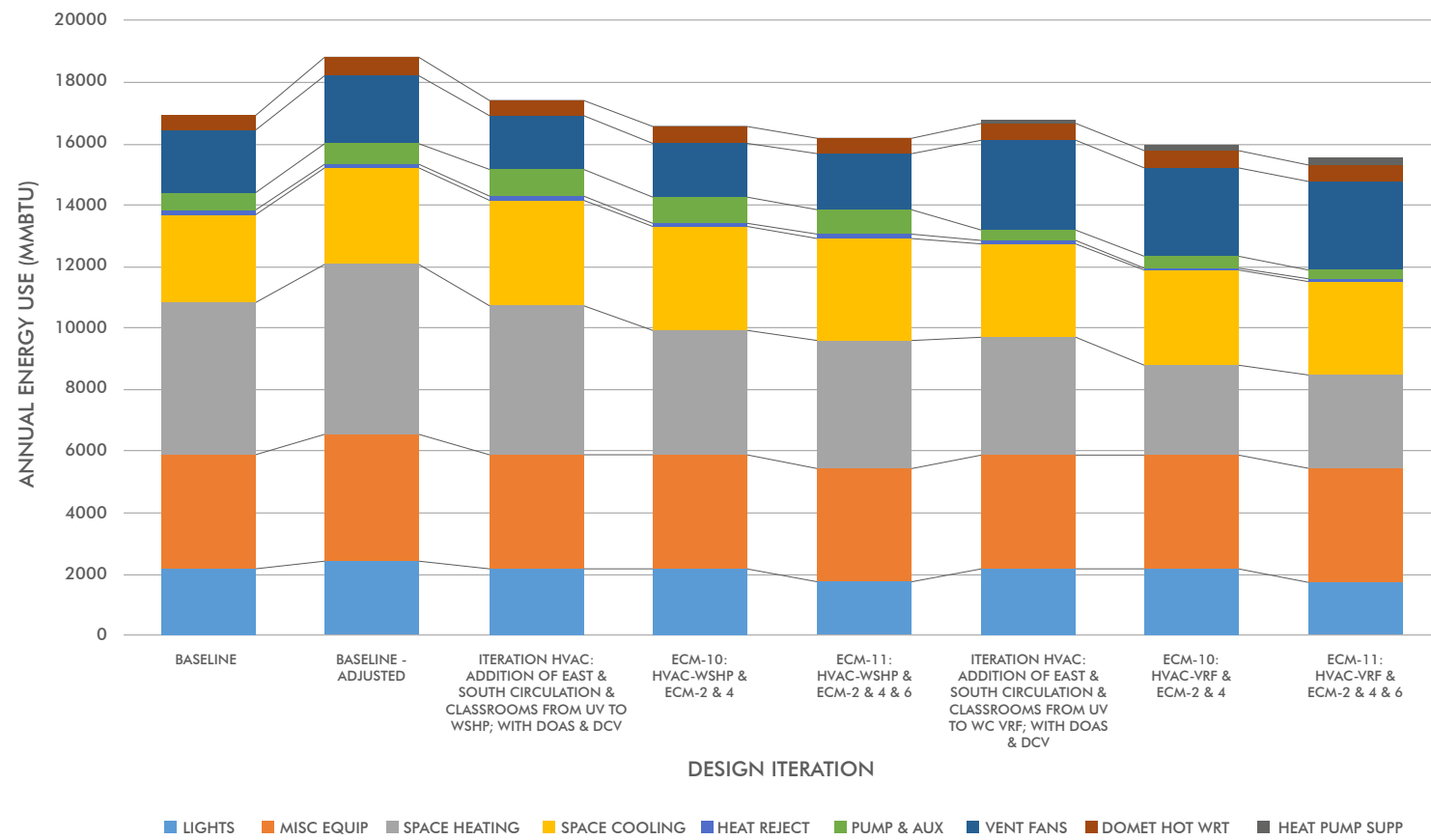
Energy Conservation Measures evaluated include the following:

- Baseline: Represents the existing building from site observations, plans, and building assessment.
- ECM-1: Same as the baseline building, with improved water-cooled chiller efficiency.
- ECM-2: Same as the baseline building, with steam boiler replacement with condensing hot water boilers.
- ECM-3: Same as the baseline building, with variable-speed chilled-water pumps.
- ECM-4: Same as the baseline building, with variable-speed hot-water pumps.
- ECM-6: Same as the baseline building, with the interior lighting power reduced 35%.
- ECM-7: Same as the baseline building, with the addition of daylight sensors in the classrooms.
- ECM-9: Same as the baseline building, changing AHU-1/MZ-1 fan(s) to variable speed from constant speed.
- Water source heat pumps: based on efficiency from 90.1-2010 calculations
- Variable refrigerant volume system: based on an air-cooled system
- ECM-2 & ECM-4: same as above, on the remaining boiler plant
- ECM-6: Reduction in interior lighting power

Energy Analysis
Total Building Use

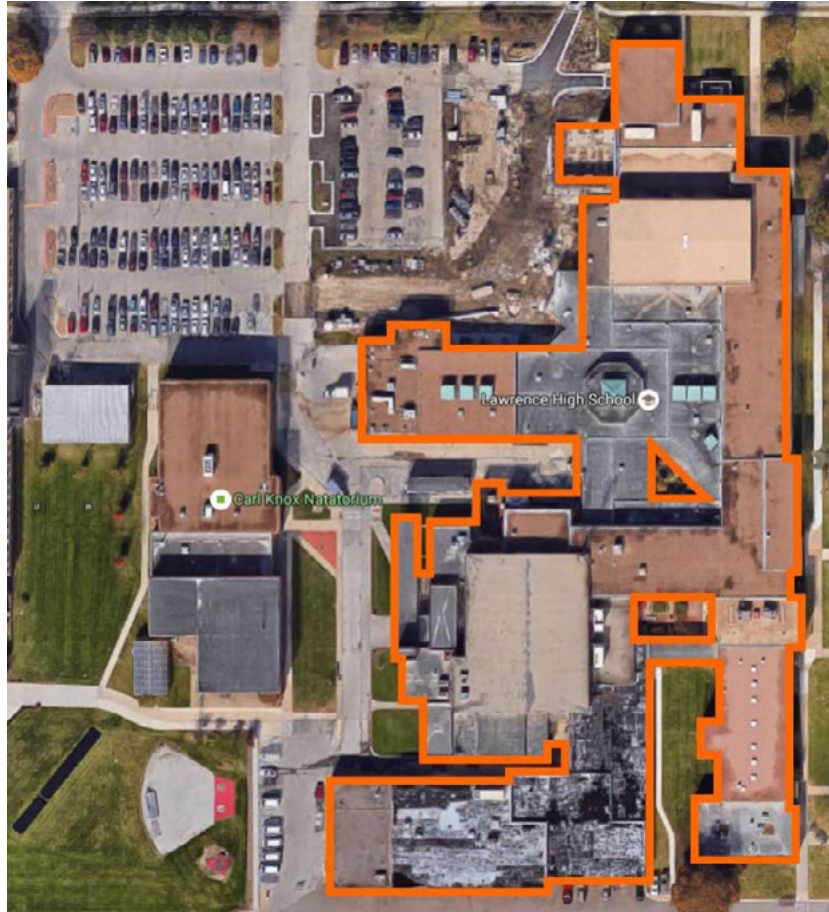


ENERGY COMPARISON BY TOTAL BUILDING ENERGY USE



ENERGY COMPARISON BY TOTAL BUILDING ENERGY USE: NEW HVAC SYSTEM

Sustainability
Net Zero Ready Target



LAWRENCE HS, USABLE
ROOF AREA FOR PV

Estimated Peak PV Rating: 1.7MW

Estimated PV Energy Production --- 2300 MWh/yr

School – 240,000 SF

Usable Roof Area for PV – 125,000 ft²



Target EUI if all ECMs Are Taken

40-60 kBTU/ft²/yr

Energy Use Covered by PV Array

Approx. 80%

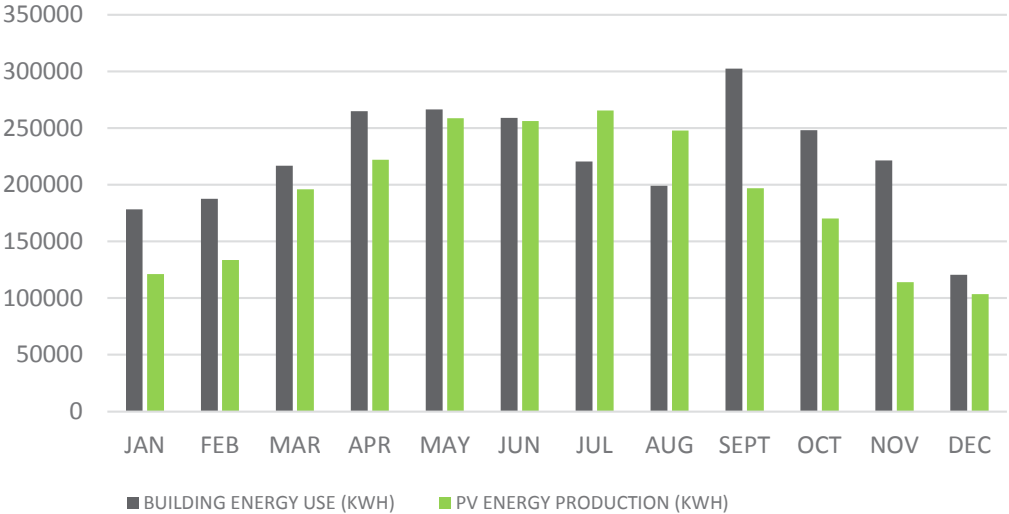
Target EUI for Net Zero

32 kBTU/ft²/yr

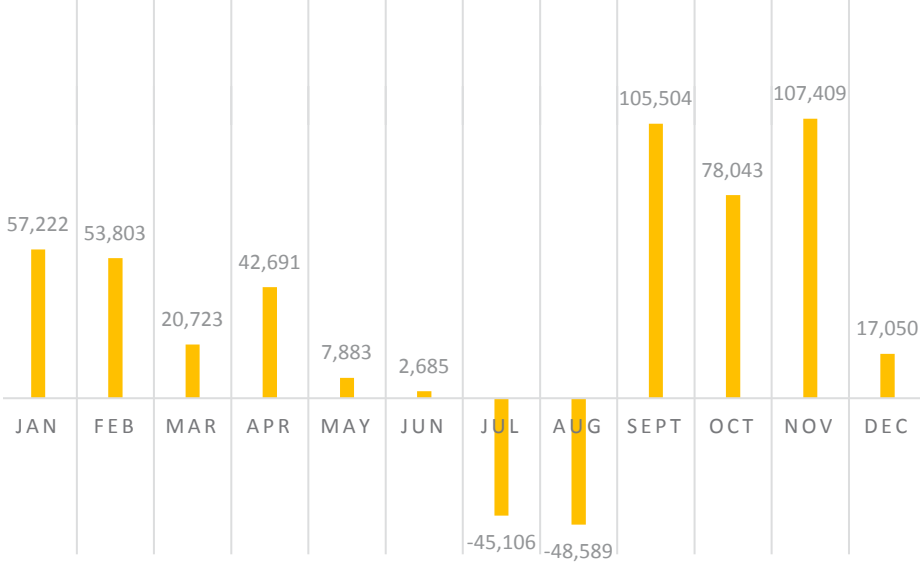
Electricity Cost (No PV) - \$1.16/ft²/yr

Electricity Cost (PV) - \$0.21/ft²/yr

SAVINGS WITH PV SYSTEM - \$0.95/FT²/YR

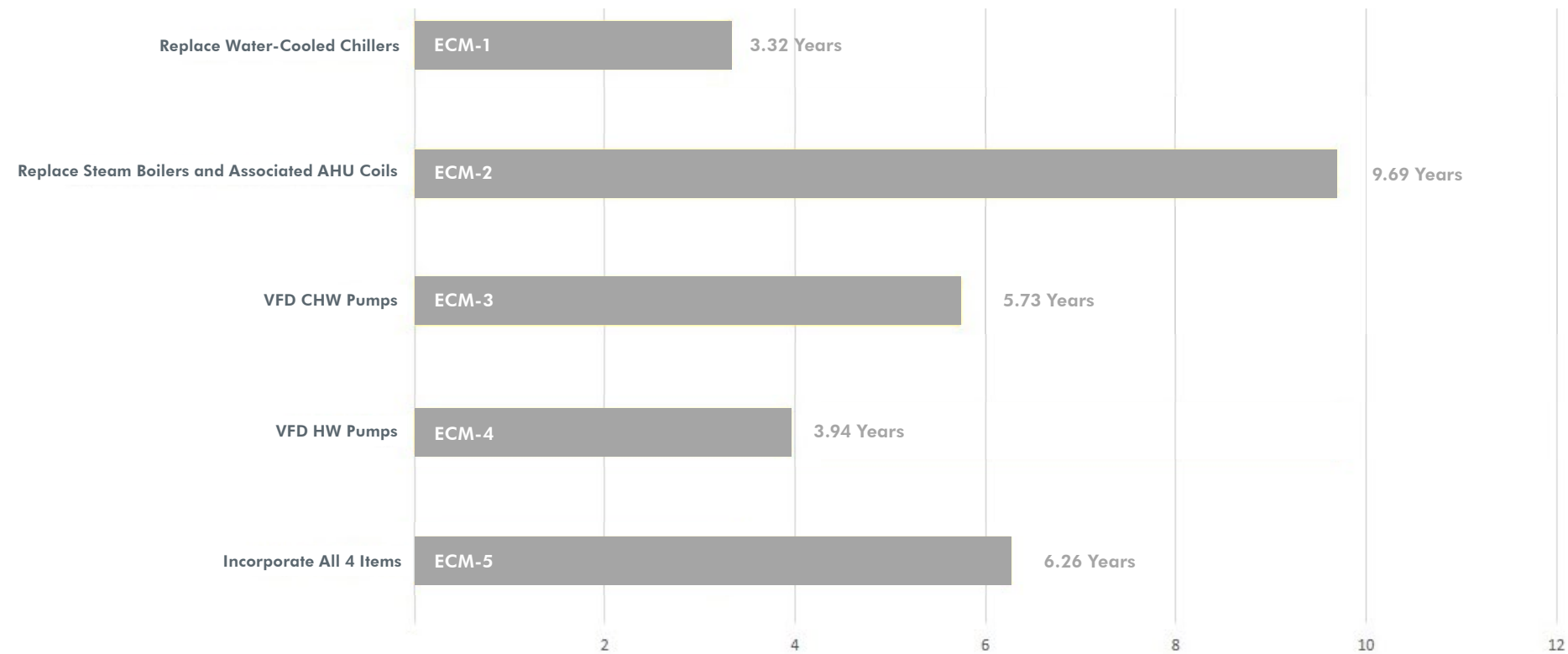


ELECTRICAL ENERGY CONSUMPTION VS. PRODUCTION



NET ENERGY FROM UTILITY

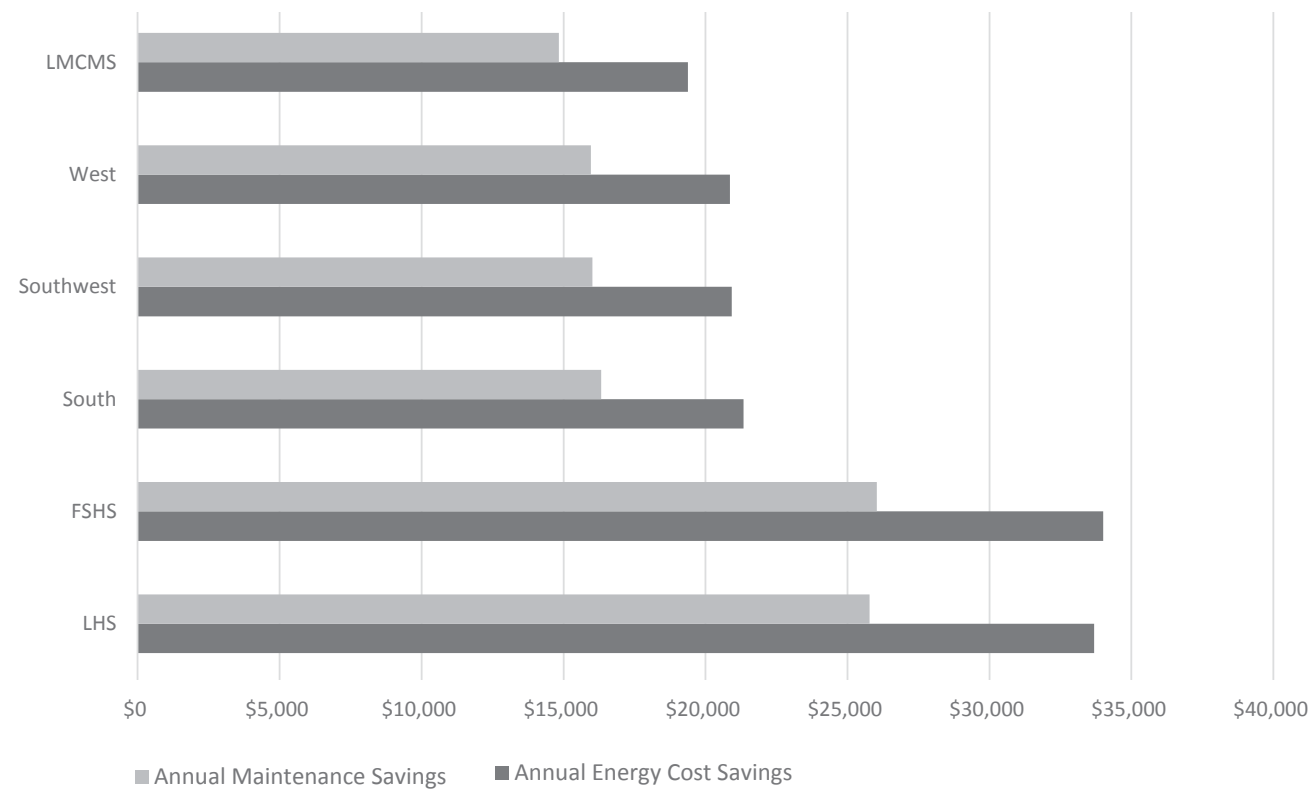
Chiller And Boiler System Upgrades
Simple Payback Analysis



SIMPLE PAYBACK (INYEARS) FOR PRIORITY 2/3 MEP OPTION

ECM	Total First Cost	First Year Energy Cost Savings	Simple Payback
Baseline	\$ -	\$ -	
ECM 1	\$ 72,000.00	\$ 21,676.05	3.32
ECM 2	\$ 140,000.00	\$ 14,450.70	9.69
ECM 3	\$ 27,600.00	\$ 4,816.90	5.73
ECM 4	\$ 22,800.00	\$ 5,780.28	3.94
ECM 5	\$ 262,400.00	\$ 41,907.03	6.26

Maintenance costs for new equipment are conservatively assumed to be equal to current maintenance costs. Good maintenance practices at Lawrence High School have kept Chiller and Boiler equipment running beyond the anticipated life expectancy and maintenance costs low.



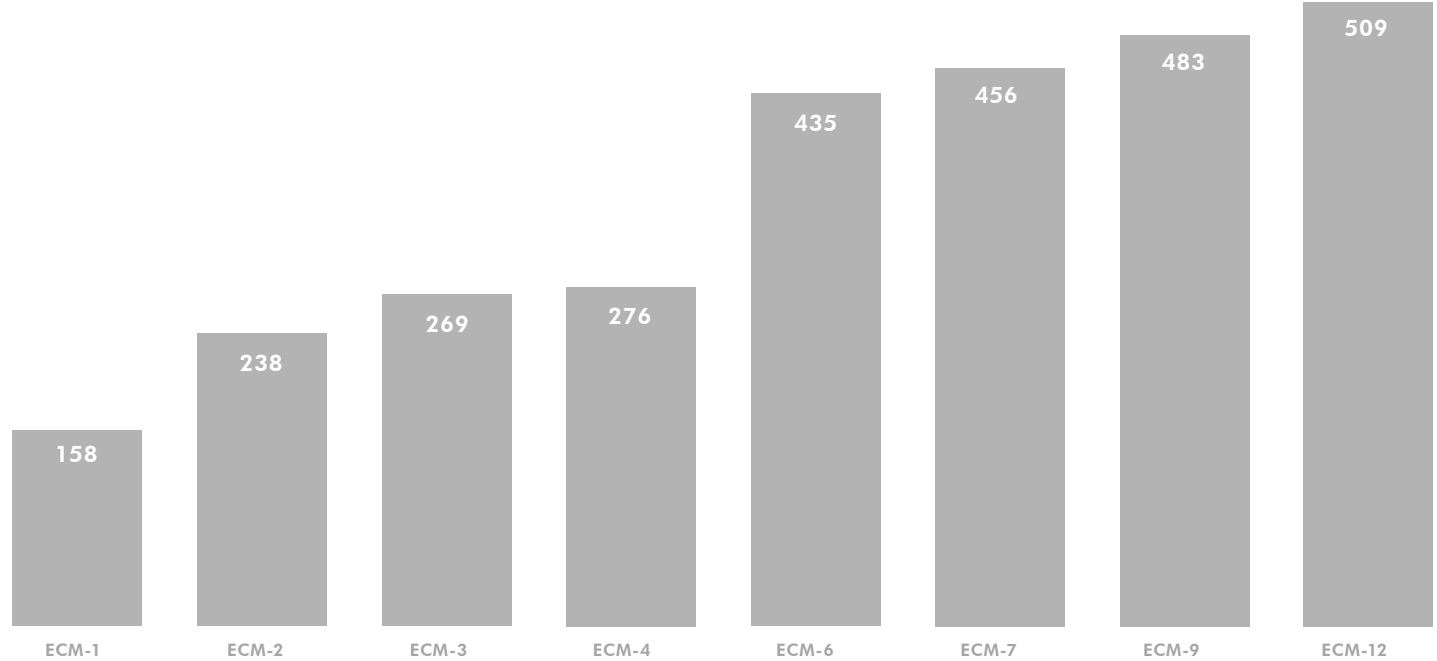
ANNUAL ENERGY COST SAVINGS

Equates to 8-year simple payback compared to fluorescent lighting upgrades

Payback period based on first cost of LED system and energy and maintenance savings only. Assumes that the current lighting system does not need to be replaced.

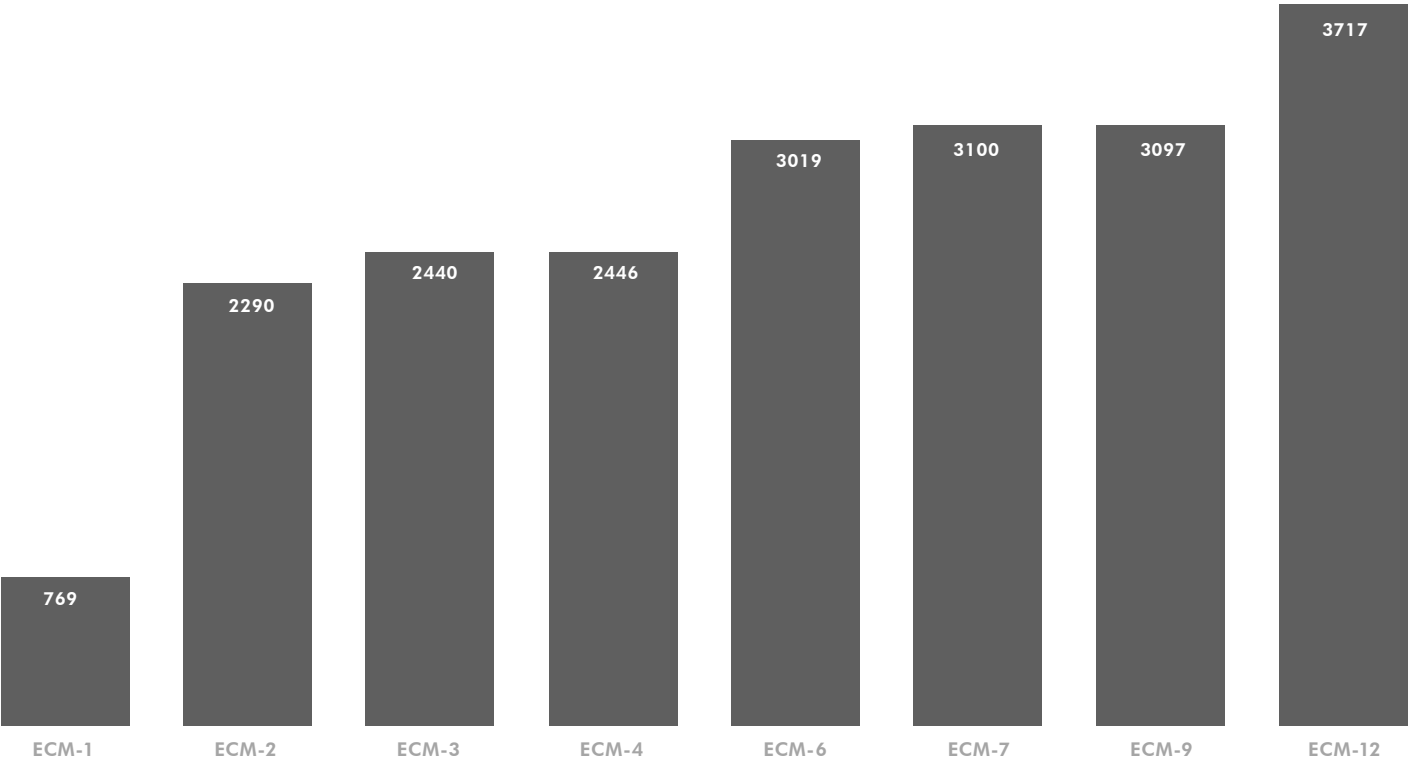
City of Lawrence Energy Code - IECC 2015/ASHRAE 90.1 2013: Both codes require automatic daylight dimming in classrooms. If the lighting system needs to be replaced, the first cost of an LED system will be comparable to a new dimmable fluorescent system.

Greenhouse Gas
Emissions Reductions



METRIC TONS OF CO2 SAVED

Greenhouse gas emission reduction for each ECM are aggregate of all prior ECM's with ECM shown.



ENERGY CONSUMPTION REDUCTION (MMBTU)

Energy consumption reduction for each ECM is an aggregate of all prior ECM's with ECM shown.

25-yr Life Cycle Analysis
Global and Unique Parameters

ECM Name	Description
Baseline	Existing Building
ECM 1	Replace Water Cooled Chillers
ECM 2	Replace Steam Boilers and AHU Coils
ECM 3	VFD CHW Pumps
ECM 4	VFD HW Pumps
ECM 5	Take ECM's 1-4

ENERGY CONSERVATION MEASURES

These ECMs are the energy-saving measures possible, analyzed in different combinations to help prioritize and sequence work appropriately.

Project Name	Lawrence High School
Building Area	240,845 gross sq ft
Basline Capacity	900 tons cooling
Analysis Duration	25 years
Discount Rate	5.0%
Inflation Rate	2.0%
Escalation Rate	2.0%
Total Escalation	4.0%

LIFE CYCLE COST ANALYSIS PARAMETERS

These are the foundational variables that are the base point for the energy analyses - size, capacity of system, utility rates.

MEP Replacement Cost Summary			Escalation Rate:	Inflation Rate		
	Baseline	ECM 1	ECM 2	ECM 3	ECM 4	ECM 5
Equipment Life Cycle (Years)	10	30	30	2	20	0
Equipment Replacement Cost	\$ -	\$ 72,000	\$ 140,000	\$ 27,600	\$ 22,800	\$ 262,400
One-Time Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Salvage Value	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Replacement Cost per Ton	\$ -	\$ 80	\$ 156	\$ 31	\$ 25	\$ 292
Lifetime Equipment Cost	\$ -	\$ (42,000)	\$ 44,000	\$ 364,058	\$ 56,680	\$ 262,400
Net Replacement \$ Savings vs. Baseline	\$ -	\$ 42,000	\$ (44,000)	\$ (364,058)	\$ (56,680)	\$ (262,400)

Building Energy Cost Summary			Escalation Rate:	Inflation Rate		
	Baseline	ECM 1	ECM 2	ECM 3	ECM 4	ECM 5
Annual Energy Cost per sq. ft.	\$ 1.61	\$ 1.52	\$ 1.55	\$ 1.59	\$ 1.59	\$ 1.44
Lifetime Energy Cost	\$ 12,420,083	\$ 11,725,793	\$ 11,957,223	\$ 12,265,797	\$ 12,234,939	\$ 11,077,789
Net Energy Cost Savings vs. Baseline	\$ -	\$ 2,472,187	\$ 1,648,125	\$ 549,375	\$ 659,250	\$ 4,779,561

MEP Maintenance Cost Summary			Escalation Rate:	Inflation Rate		
	Baseline	ECM 1	ECM 2	ECM 3	ECM 4	ECM 5
Annual Maint. Cost per sq ft	\$ 0.50	\$ 0.50	\$ 0.50	\$ 0.50	\$ 0.50	\$ 0.50
Lifetime Maint. Cost	\$ 3,857,169	\$ 3,857,169	\$ 3,857,169	\$ 3,857,169	\$ 3,857,169	\$ 3,857,169
Net Maint. Cost Savings vs. Baseline	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

ECM COST / SAVINGS SUMMARY

The above table shows cost and savings of each energy conservation measure, with life cycle parameters factored.

ECM #	Description	Building Energy Costs	MEP Replacement Costs	MEP Maintenance Costs	Total Lifetime Cost	Net Savings vs. Base	Net Present Value (NPV)
Baseline	Existing Building	\$ 12,420,083	\$ -	\$ 3,857,169	\$ 16,277,252	\$ -	N/A
ECM 1	Replace Water Cooled Chillers	\$ 11,725,793	\$ 42,000	\$ 3,857,169	\$ 15,624,962	\$ 652,290	\$303,913.07
ECM 2	Replace Steam Boilers and AHU Coils	\$ 11,957,223	\$ 44,000	\$ 3,857,169	\$ 15,858,392	\$ 418,860	\$114,989.66
ECM 3	VFD CHW Pumps	\$ 12,265,797	\$ 364,058	\$ 3,857,169	\$ 16,487,023	\$ (209,771)	(\$164,263.44)
ECM 4	VFD HW Pumps	\$ 12,234,939	\$ 56,680	\$ 3,857,169	\$ 16,148,788	\$ 128,465	\$65,454.09
ECM 5	Take ECM's 1-4	\$ 11,077,789	\$ 262,400	\$ 3,857,169	\$ 15,197,357	\$ 1,079,895	\$470,231.93

ECM COST / SAVINGS SUMMARY

The above table shows the initial cost vs. return-by-savings calculated over a period of 25 years, per ECM.

SUMMARY, BUDGET+ PHASING

Scope Summary

ALL SCHOOLS

- Provide flexible spaces to enhance students’ educational experiences and opportunities to collaborate, create and innovate
- Address equity issues across school facilities
- Deliver energy efficient, high-performance schools that promote student/staff wellness and success
- Roof repairs/replacement at all 6 schools, needing work through 2020
- Priority 1 (life safety) mechanical, electrical, plumbing upgrades at LHS, FSHS, LMCMS, and WMS
- Allowances at all schools to improve restrooms/showers for all students

LAWRENCE HIGH SCHOOL

27,000 sf of additions to create a secure campus, and right-size classrooms

- Link to annex
- Link to auxiliary gym and natatorium
- East addition to create space for expanded classrooms and address thermal and moisture concerns at existing masonry wall.
- Addition to the kitchen to increase number of serving lines to accommodate current and increasing student enrollment

288,000 sf of renovation to address classroom size, building circulation and spaces and systems that are 60 years old

- Renovate all classrooms, except recently renovated science classrooms (additional bench space provided in existing science classrooms to accommodate additional students)
- Renovate fine arts: auditorium stage, orchestra room, storage and rehearsal space
- Renovate PE and athletic locker rooms
- Modernize library-media center
- Administrative area (assistant principals, counselors, etc.)
- Career and technical education area
- Create a large flexible student collaboration space
- Establish outdoor learning spaces

- Reduce lockers by 50% to create student collaboration spaces along main corridor
- Expand and renovate natatorium (new HVAC, drainage channel, new expanded pool deck and bleachers)
- Minor renovations to auxiliary gym — eliminate bleachers at floor level, new paint and drop-down volleyball nets, new permanent bleachers in mezzanine, and separation between auxiliary gym and wrestling room
- Rerouting of fire lane and public entrance to 19th and 21st streets
- Expanded bus lane

FREE STATE HIGH SCHOOL

18,000 sf of new additions to address overcrowding of classrooms

- Addition of new classrooms
- Create a large flexible student collaboration space
- Expanded multipurpose space for activities and athletics

21,000 sf of renovations (update)

- Improve layout and function of special services
- Incorporate flexible student collaboration spaces
- Modernize library-media center
- Increase number of lockers in PE and athletic locker rooms

Allowance of \$750,000

- Provide additional parking south of the baseball field
- Add sidewalks at athletic venues
- Repair main parking lot

WEST MIDDLE SCHOOL

17,500 sf of renovations

- Enlarged classrooms
- Create flexible student collaboration spaces
- Add Storage
- Modernize library-media center
- Building-wide HVAC replacement

LIBERTY MEMORIAL CENTRAL MIDDLE SCHOOL

6,500 sf of renovations

- Replace single-tier lockers with double-tier to provide space for flexible student collaboration spaces along corridors
- Reconfigure classroom and office space on 1st and 3rd floors
- Modernize library-media center
- Improvements to auditorium stage

SOUTHWEST MIDDLE SCHOOL

3,000 sf of renovations

- Allowance of \$235,000 to modernize library-media center and to create additional student collaboration spaces
- Replace fire alarm system

SOUTH MIDDLE SCHOOL

3,000 sf of renovations

- Allowance of \$235,000 to modernize library-media center and to create additional student collaboration spaces

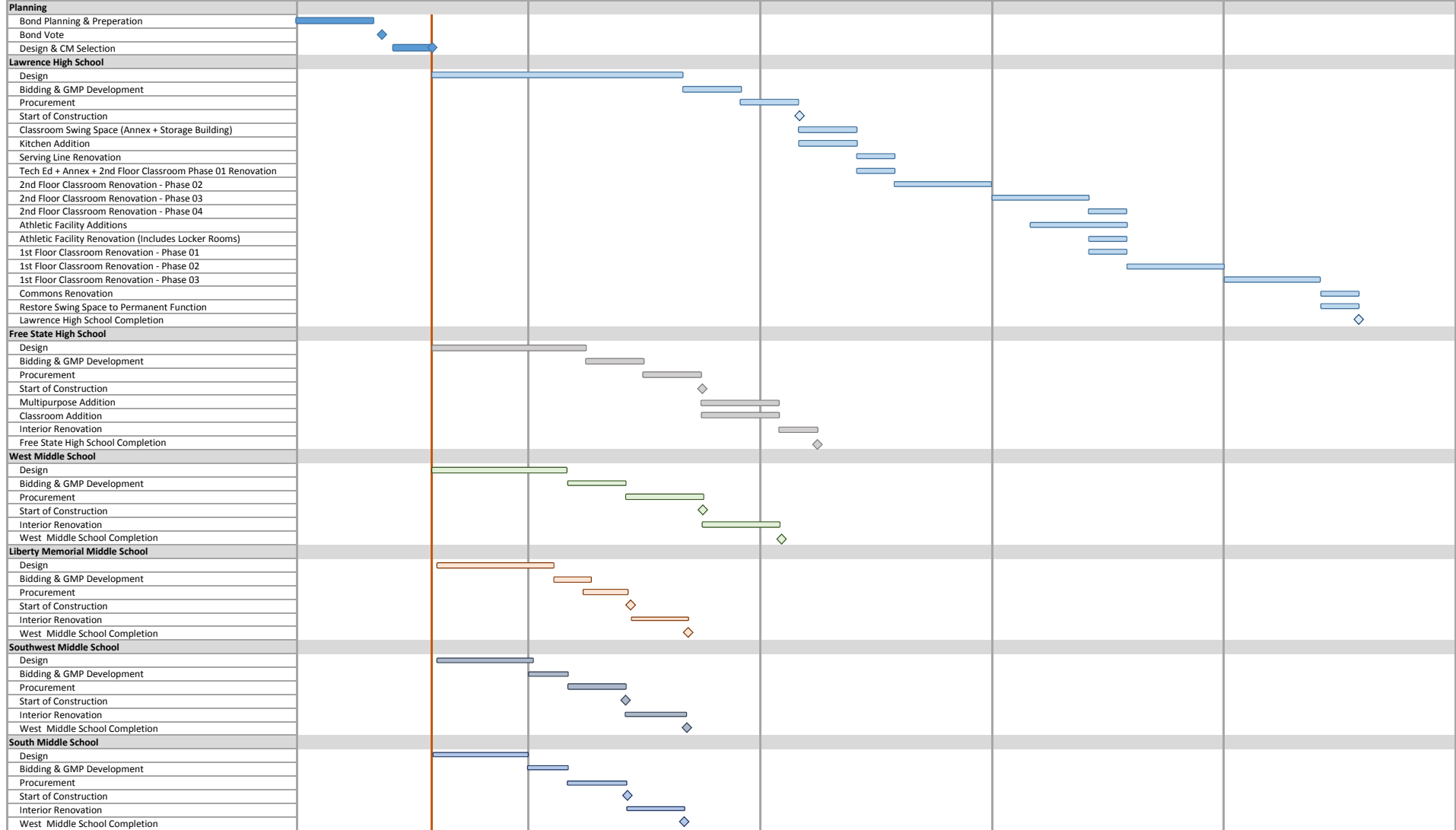
LAWRENCE COLLEGE AND CAREER CENTER

- Finish space to move culinary arts program from Holcom
- Improve existing educational spaces

Lawrence High School	\$50,800,000
Free State High School	\$15,200,000
West Middle School	\$9,800,000
Liberty Memorial Central Middle School	\$4,300,000
Southwest Middle School	\$4,300,000
South Middle School	\$1,800,000
Lawrence College and Career Center	\$600,000
Technology - Data & Information Management Systems	\$200,000

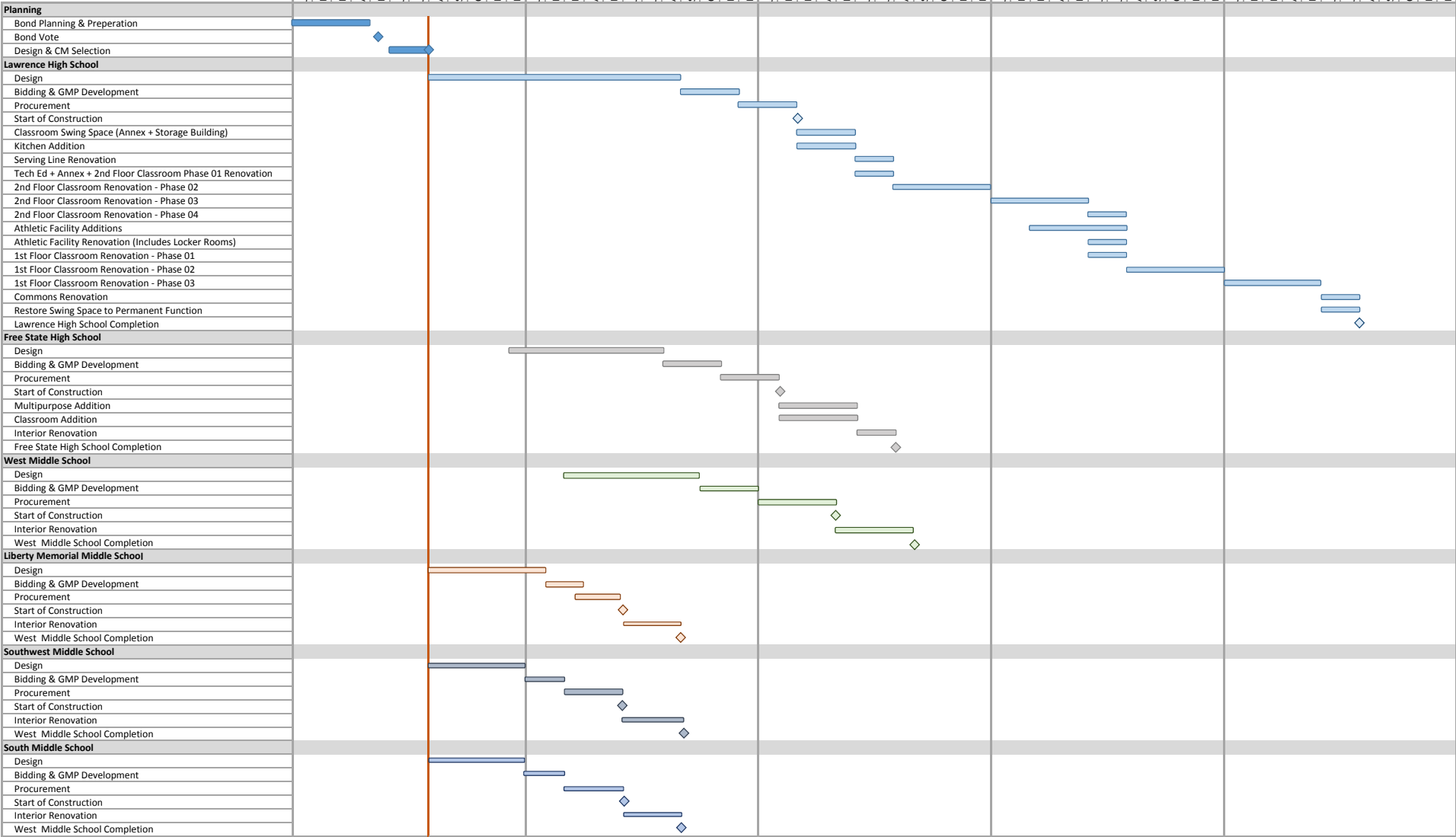
TOTAL PROJECT COSTS	\$87,000,000
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Schedule OPTION A Concurrent Design Phases



This essentially shows where the projects would time out based on design for each of them happening concurrently.

Schedule OPTION B
Staggered Design Phases



This schedule is adjusted to show Free State HS and West MS wrapping up with work in the summer of 2019. From a duration of construction standpoint, it fits more naturally given the associated summer work.

LHS Phasing

PHASE 01 (Spring '18 - Aug '18)

- 1. Construct future storage building and install temporary classrooms
- 2. Convert portion of tech center into temporary classrooms
- 3. Addition connecting annex, east elevation addition, and kitchen addition
- 4. Renovate annex

PHASE 02 (May '18 - Aug '19)

- 5. Classroom renovations, sequenced, likely focused on second floor

PHASE 03 (March '19 - Aug '19)

- 6. Begin additions for athletics (elevator/stair tower, covered walkway, natatorium, and infill by locker rooms)
- 7. Summer — locker room renovations south of gym

PHASE 04 (Aug '19 - Aug '20)

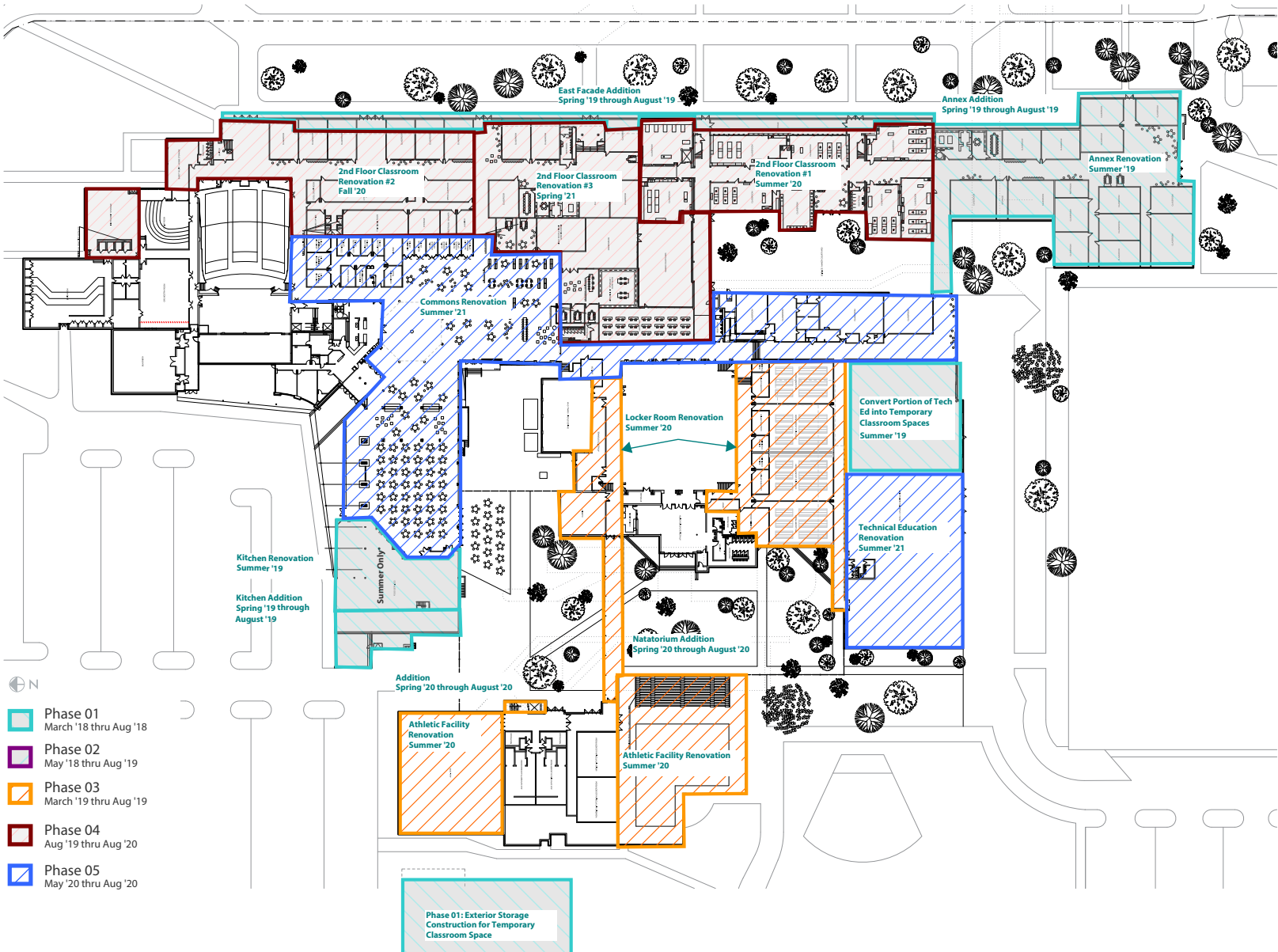
- 8. Classroom renovations, sequenced, likely focused on first floor

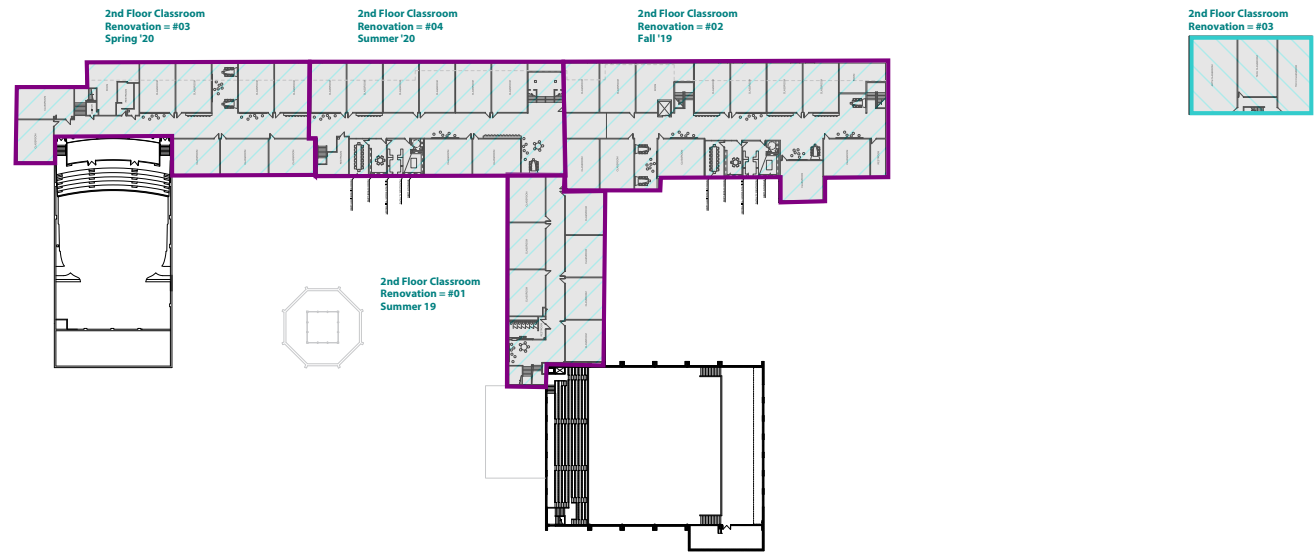
PHASE 05 (May '20 - Aug '20)

- 9. Commons area renovations first floor

GENERAL

- Overall 24 to 30 months duration
- Each phase may have sub-phases
- Additions general start in spring





- Phase 01
March '18 thru Aug '18
- Phase 02
May '18 thru Aug '19
- Phase 03
March '19 thru Aug '19
- Phase 04
Aug '19 thru Aug '20
- Phase 05
May '20 thru Aug '20

