TRINIDAD
School District Number 1

Facilities Maintenance Master Plan

Updated: February 2018

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I. Executive Summary

Foundation of Trinidad School District 1

Mission

Trinidad School District #1 will provide all students with a comprehensive system of support, a safe learning environment, and the opportunity to reach his/her academic and leadership potential as determined by state and national standards.

Vision

"At Trinidad School District #1, we honor the rich history of our schools and our community. We are proud to be the first established school district in Colorado. While being mindful of our local history, our students develop life skills relevant to their community as well as the world. Our students enjoy and excel in the academics, arts, and extracurricular activities while recognizing their civic responsibilities. Along with providing a well-rounded and diverse education, the district provides the support needed for each student to reach his or her highest academic, social and leadership potential.

We value the importance of using data from formative and state assessments to foster high levels of achievement. Effective instructional strategies, methods, and tools are used to engage our students, allowing them to excel in their academic pursuits. The rich education we offer allows our students the freedom to make educational discoveries and become leaders in the creation of cultures that support diversity and the freedoms espoused by our government.

Our students graduate with the skills to be successful in college, vocational education, the work force and life. They excel in language, reading, writing, math, social studies, sciences, and the arts. Our students respect diversity, appreciate the freedoms allowed by our democracy and possess a high sense of responsibility while holding themselves accountable for their own actions. We as a school district and community hold ourselves accountable to the students we serve in assisting them in the pursuit of achieving this vision."

Values

1. The District will ensure that all students learn at their highest potential in academics and leadership.
2. The District will prepare all students for further education to enter the workforce and to be life-long learners.
3. The District will collaborate with families to support each student in his/her educational endeavors.
4. The District will model and teach all students the importance of respecting diversity and holding ourselves accountable for our individual actions.
5. The District will model high values, standards, and behaviors through effective instruction.
6. The District will instill frequent interim assessments and continuously improve instruction through curriculum aligned with state standards.
7. The District will recognize and honor quality performance and celebrate student success.
8. The District will communicate its Mission, Vision and Values to all students and the community.

Belief Statement

These statements are accepted as doctrines by the Board of Education and as such are the expectations that shall govern decision-making in the Trinidad School District 1.

1. We believe that all students shall learn and achieve.
2. All decisions shall be made in the best interest of the students.
3. We believe that improved student achievement requires families and communities to be partners in the educational process. Parents/guardians shall be valued and respected.
4. We believe that increased student achievement requires staff to be responsible and accountable for their students' education.
5. We believe that increased student achievement requires students to be responsible and accountable for their own education.
6. We believe that increased student achievement requires families to be responsible and accountable for their children's education.
7. We believe that ALL Trinidad School District #1 schools will demonstrate growth according to district, state and national guidelines.
8. We believe in, and expect all, to respect the dignity and worth of every individual.
9. We believe that a quality education requires:
    a. An effective, qualified teacher in every classroom;
    b. An effective, qualified principal focused on instruction in every school;
    c. A challenging system wide curriculum;
    d. A results-oriented, data-driven focus based on continuous growth;
    e. Shared accountability among teachers, principals, and central office personnel;
    f. Early intervention for young children.
10. We believe that every employee must model ethical behavior, exhibit a strong work ethic, and perform at high levels.
11. We believe that all TSD#1 departments and offices must demonstrate continuous improvement.
12. We believe that technology is the key to the future.
13. We believe that decisions should be founded on data and not emotion.

Assessment Findings

Overview

Trinidad Middle School is the oldest, and largest facility in the Trinidad School District. The original building was constructed in 1911 and is approximately 41,000 square feet spread over three floors. This area contains most of the classrooms. A pool, gym, and auditorium were added in 1922, adding approximately 24,000 square ft. In 1964, Park Street Elementary was constructed adjacent to the Middle School, and in 1993 the 20,882-square foot building was joined to the 1911 and 1922 facilities with a large atrium. In addition, a new gym, cafeteria, and library were added to the school in a 1993 renovation, adding approximately 30,000 square feet to the Middle School.

Today, the total area of the Middle School is approximately 115,600 square feet. As expected with a facility of this age and eras, much of building systems have fallen victim to deferred maintenance and have outlived their useful life.

It is clear to Trinidad School District 1 and the professionals of the Project Development Team that the foundation of future facility capital funding should be centered on addressing these imminent failures with a comprehensive renovation of Trinidad Middle School. Although the district faces an extensive facility needs list across all district facility, as this Master Plan will outline, the district can only responsibility address these improvements in phased approaches.

The comprehensive renovation of Trinidad Middle School is a significant first step in executing the Facility Master Plan goals, and provides the district with a modern educational environment and the foundation of the district for decades to come, as it had for over century before.

The need to bring this facility to a modern K-12 educational standard and ensure its future use will be clearly defined and presented throughout the Facility Maintenance Master Plan and subsequent BEST Grant Application.

District Goals:

1. Addresses highest priority district needs, starting with the renovation of the Trinidad Middle School to a modern K-12 educational facility
2. Address decades of significant deferred maintenance
3. Ensuring the effective and operable use of the facility for the future
4. Improves the student learning environment
5. Improves the safety of district students and staff
6. Relieving an overburdened maintenance staff & budget
7. Reallocating budget funds from reactive to proactive expenditures

II. History of Trinidad School District 1

The History of Trinidad School District 1

What is today known as Trinidad School District #1 was organized in 1866, ten years prior to Colorado becoming a state. Between the years of 1872 to 1932, the Trinidad School District 1 was just one among the 131 other school districts in Las Animas County. Despite the breadth of other school districts in Colorado, Trinidad School District 1 was the first school district in the state of Colorado to be accredited by the North Central Association of Secondary Schools. At present, the district has one elementary school housing grades K-1, one elementary school housing grades 2-5, one middle school housing grades 6-8, and one high school housing grades 9 -12, with a total enrollment of 1026 students.

Trinidad Miners

1881: Rice School Building

The Rice School Building was Trinidad's first major investment in education. This facility was completed in 1881 at a cost of $10,000. In 1882, this building served as Trinidad's first formal high school, which offered a three-year course of studies. It stood at the corner of Maple and Second Streets and originally served both elementary and high school students from 1911-1947. The first high school class to graduate from Rice was the Class of 1885.

The original Rice School was razed in July of 1949 to make room for a new facility. The new facility cost the district $182,000 and was completed by the time classes began in the fall of 1950. This building started out as a high school, but also served as a junior high school, an elementary school, and an office space for the district's administration offices.

Rice School Building – 1881

Post card of the Rice Building

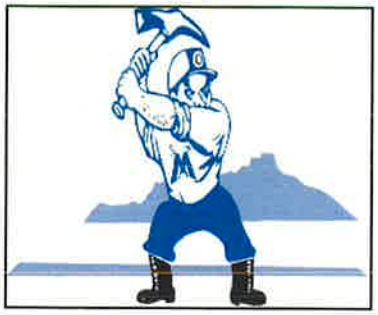
1911: Construction of Original Trinidad High School

The original portion of what currently stands as Trinidad Middle School, but was originally built as Trinidad High School. It has been a cornerstone of education in Trinidad since it was opened on September 11, 1912. During the first year it was open, 252 students were enrolled, but these numbers nearly quadrupled by the 1940s.

The building has expanded beyond the 1912 facility to create more opportunities for its students. An auditorium and a gymnasium with a swimming pool were constructed in 1922. A stadium was added alongside the facility in 1927. A cafeteria on the lower floor of the building as well as rooms for the commercial department were added in 1933. Finally, a band room was added in 1947 to add the final touch to the facility and prepare it to serve dozens of generations of future "Miners." The Trinidad High School was repurposed into the Trinidad Middle School in the early 1970s and high school students reported to the new Trinidad High, which was build adjacent to what had been the Trinidad High School.

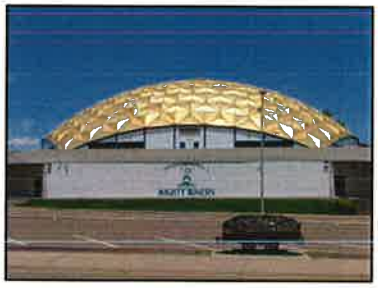
Original 1911 Trinidad High School (now Trinidad Middle School)

Stone "T" at Miner Stadium built by 9-12 students in 1933



1960's Miners Logo

Fisher's Peak Elementary built in 2002



Trinidad Iconic Gold Domed Gym

1927: Miner Stadium

The athletic field which serves Trinidad High was completed in 1927; the decorative gate that stands at the main entrance to Miner Stadium is a memorial to the class of 1927. The cost of the field was approximately $5,000. The large "T" emblem of Trinidad High School, adjacent to the athletic field, was erected and assembled out of stones in 1933. The work was divided among four classes; the freshman class built the base, sophomores the stem and juniors and seniors built the arms of the letter.

1964: Park Street Elementary School

In 1964, Park Street Elementary was constructed adjacent to the Middle School, and in 1993 the 20,882-square foot building was joined to the 1911 and 1922 facilities with a large atrium. In addition, a new gym, cafeteria, and library were added to the school. The 1993 renovation added approximately 30,000 square feet to the Middle School.

1972: Trinidad High School Constructed

The High School building complex, comprised of A Building, B Building, and Donnelly Gymnasium were completed in 1972. It was determined that a new high school was the best choice while converting the "old" high school building into a Middle School. Coincidently with that decision was the closure of Rice Junior High School and Centennial Junior High School.

The High School was divided into two buildings with B Building primarily intended for industrial arts and vocational courses although it was not large enough to include auto mechanics which yet remains in a separate building adjacent to the present Middle School.

1990: Trinidad Junior High & Park Street School Additions

In October of 1990, the Board approved an application of $9,000,000 with the Colorado Association of School Boards Lease-Purchase Pool Program to complete major renovations and additions to the Trinidad Junior High and Park Street School Complexes.

2002: Fisher's Peak Elementary School Built

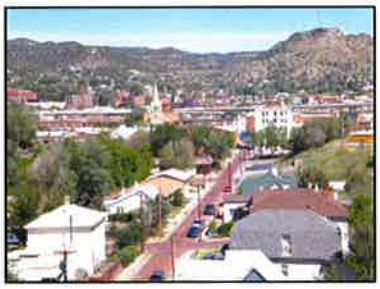
Another bond issue was approved by the voters in November of 2000, by a vote of 1950-1775, in the amount of $7,175,000 to acquire land, construct, furnish and equip a new elementary school which would replace East Street and Park Street Schools. The bond issue was also utilized to remodel, update, furnish and equip Eckhart Elementary School and replace temporary classrooms with permanent classrooms. The Fisher's Peak Elementary School opened in the fall of 2002.

About Trinidad, CO

Trinidad is a community of approximately 9,000 people that is located on the mountain branch of the famous Santa Fe Trail. It was officially incorporated in 1876 – months before Colorado became a state – and has a rich history that was molded by the scouts, trappers, and traders who first settled the area and gave it its name. In the early years of the settlement, coal mining, the railroad, and the large cattle companies thrived in the region and drew people to Trinidad from all parts of the world. In later years, natural gas extraction eclipsed the other industries in the area.

Trinidad is a picturesque town on the banks of the Purgatoire River near the southern border of Colorado. and surrounded by hills of bold rock cliff, pinon trees and sabina. The area represents an area rich in history and heritage, architecture and tourism opportunities.

The area boasts outdoor recreation such as hunting, fishing, a repertory theatre, annual rodeo, heritage festival and blues festival and award-winning golf courses and skatepark.



III. Trinidad 1 Location & Boundaries

Location of Trinidad 1 + School District Boundary

Trinidad School District 1 is in the city of Trinidad, CO, the county seat of Las Animas County, CO. The city of Trinidad sits at the southern-most border of Colorado along Interstate 25. Entrance to the city from the West travels along Highway 12, with entrance from the East travels along Highway 160.

District Geographic Data:

- 2016 City Population: 8,103
- City: Trinidad, CO (County Seat)
- County: Las Animas
- Elevation: 6,010 ft.
- District Land Area: 247 sm.
- City Land Area: 9.28 sm.
- County Land Area: 4772.67 sm.

Nearest Major Cities:

- Pueblo, CO – 84 miles to the North
- La Junta – 80 miles to the Northeast
- Colorado Springs – 128 miles to the North
- Santa Fe, NM – 195 miles to the Southwest

Higher Education:

- Trinidad State Junior College – Trinidad CO
- Colorado State University-Pueblo – Pueblo, CO
- Adams State University – Alamosa, CO
- Otero Junior College – La Junta, CO
- New Mexico Highlands University – Raton, NM

Primary Location Services:

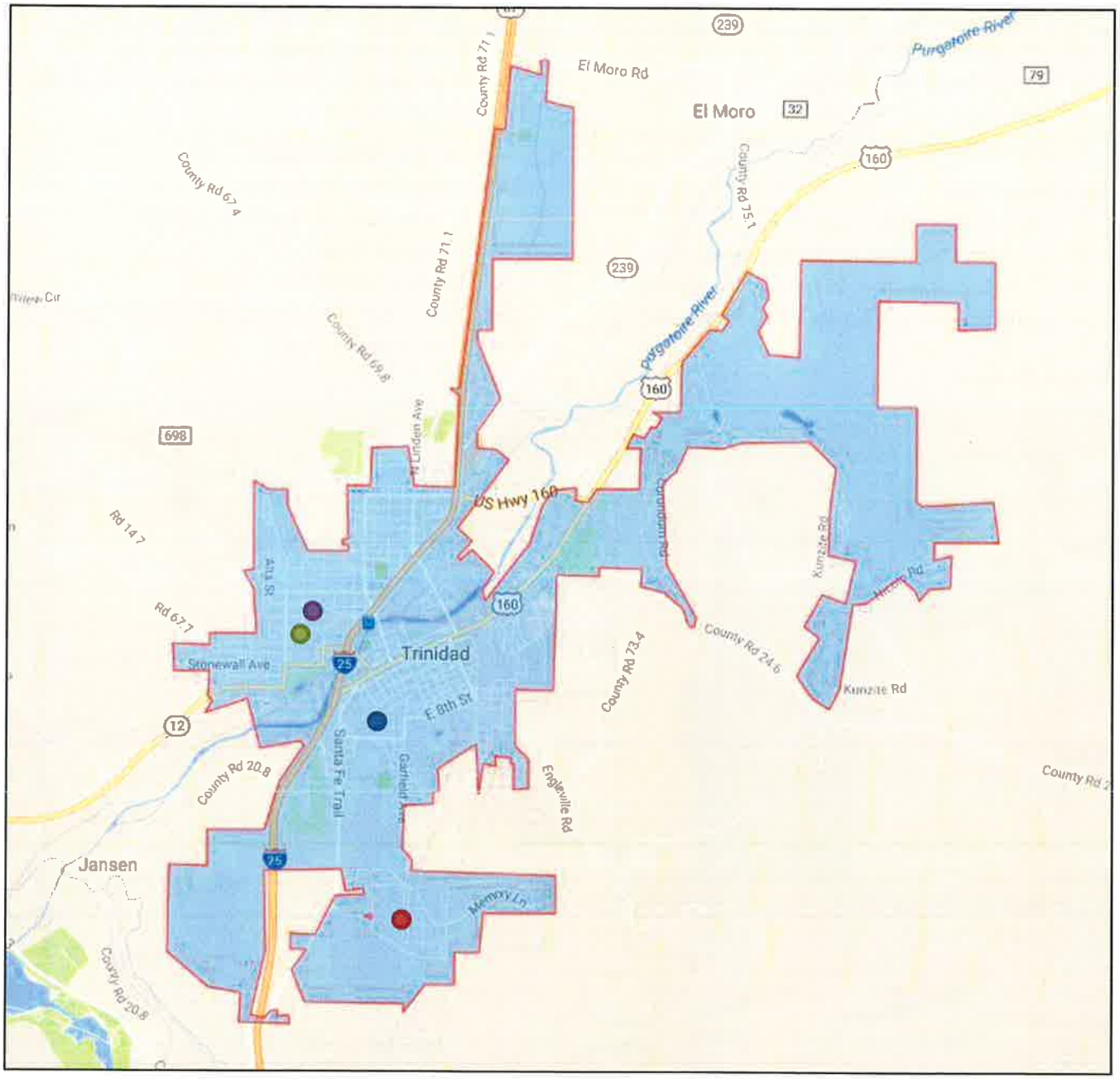
- Mt. San Rafael Hospital
- Trinidad Fire Department
- Trinidad Ambulance District (EMS)
- Carnegie Public Library
- Trinidad Community Center
- The Coach John Gagliardi Sports Complex
- Parks & Recreation

District Boundary

Locations of District Facilities

City of Trinidad

- Eckhart Elementary School (K-1)
  2021 Pierce
  Trinidad, CO 81082
- Fisher's Peak Elementary School (2-5)
  900 Moore's Canyon Rd.
  Trinidad, CO 81082
- Trinidad Middle School (6-8)
  607 Miner Dr.
  Trinidad, CO 81082
- Trinidad High School (9-12)
  816 West St
  Trinidad, CO 81082



Facility Boundaries

Eckhart Elementary (K-1)

Fisher's Peak Elementary (2-5)

Trinidad Middle School & High School

Trinidad Middle School (6-8)

Trinidad High School (9-12)

Trinidad, CO Elevation + Climate Trends

Elevation: 6,010 ft.

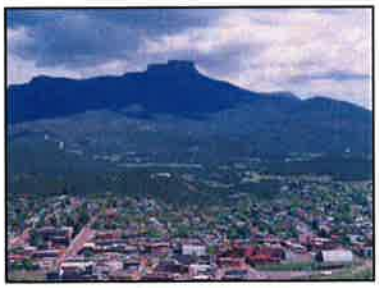
Square Miles: 9.28 sm.

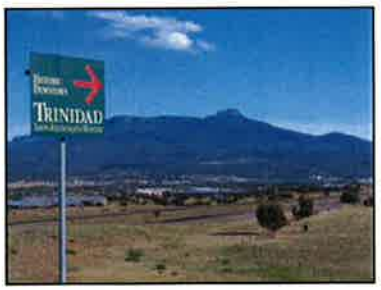
Climate: On average, there are 265 sunny days per year in Trinidad, Colorado. The July high is around 87 degrees. The January low is 18. Sperling's comfort index for Trinidad is a 73 out of 100, where a higher score indicates a more comfortable year-around climate. The US average for the comfort index is 54.

Trinidad climactic information is summarized in the table below:

Climate	Trinidad, CO	United States
Rainfall (in.)	15.46	39.2
Snowfall (in.)	57.78	25.8
Precipitation Days	40.3	102
Sunny Days	265	205
Avg. July High	87.22	86.1
Avg. Jan. Low	17.73	22.6
Comfort Index (higher=better)	73	54
UV Index	5.1	4.3
Elevation ft.	6,138	1,443

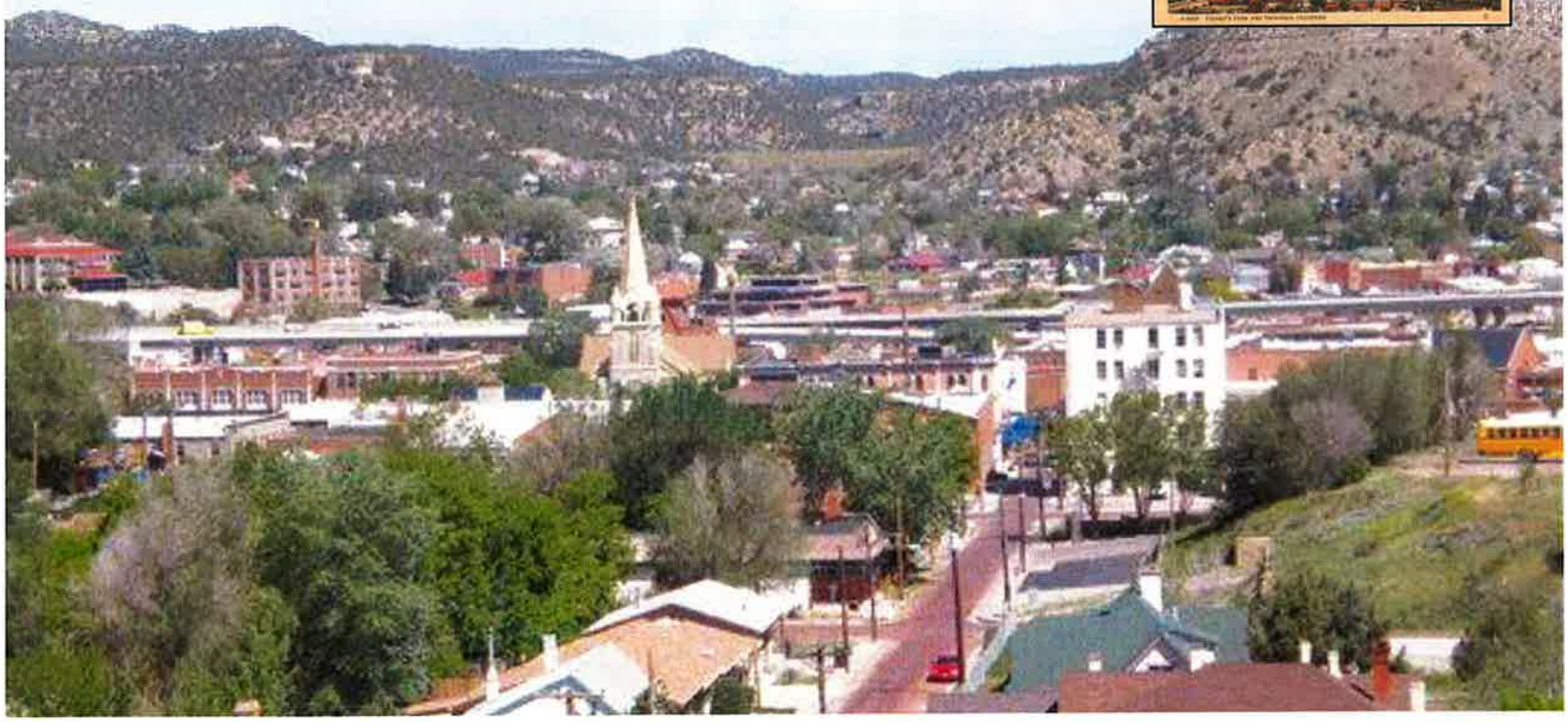
Trinidad, CO





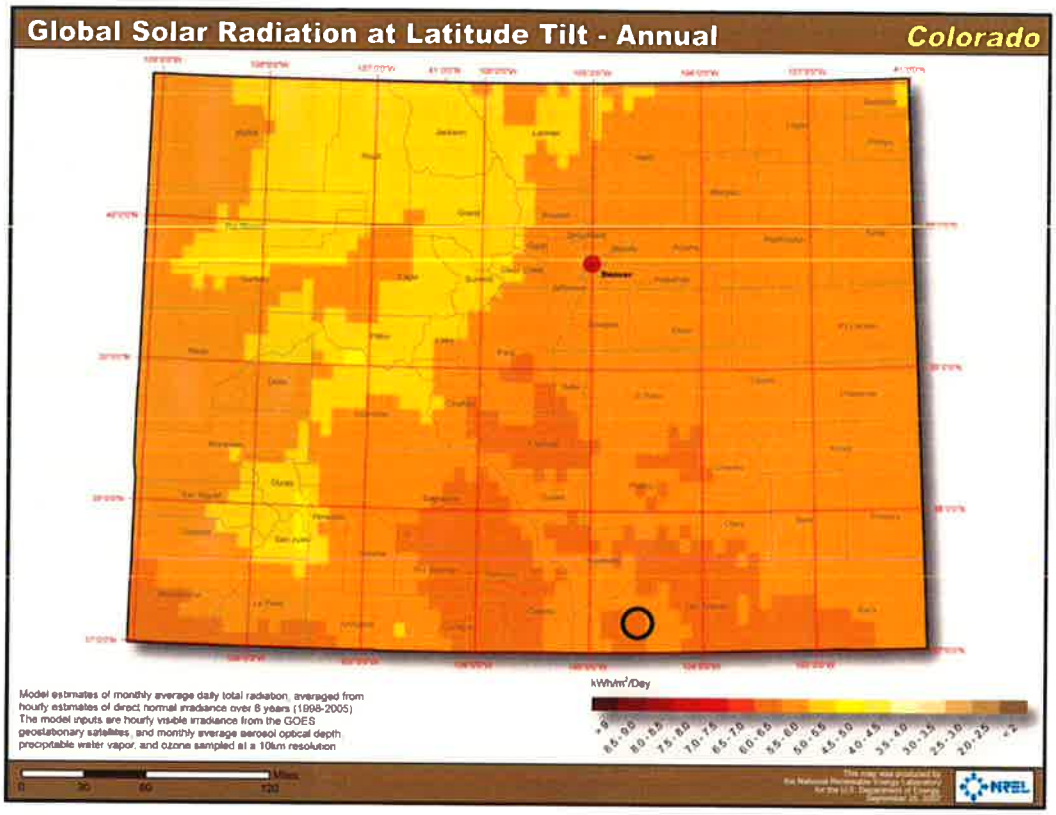
Renewable Energy Options Summary

Colorado is fortunate to have a climate that is conducive to several types of renewable energy sources, and Trinidad 1 would potentially be able to benefit from renewable energy sources. Final selection of renewable options would be at the direction of the district and the design team for future projects, but based upon initial evaluation of available data, there are several potential sources.

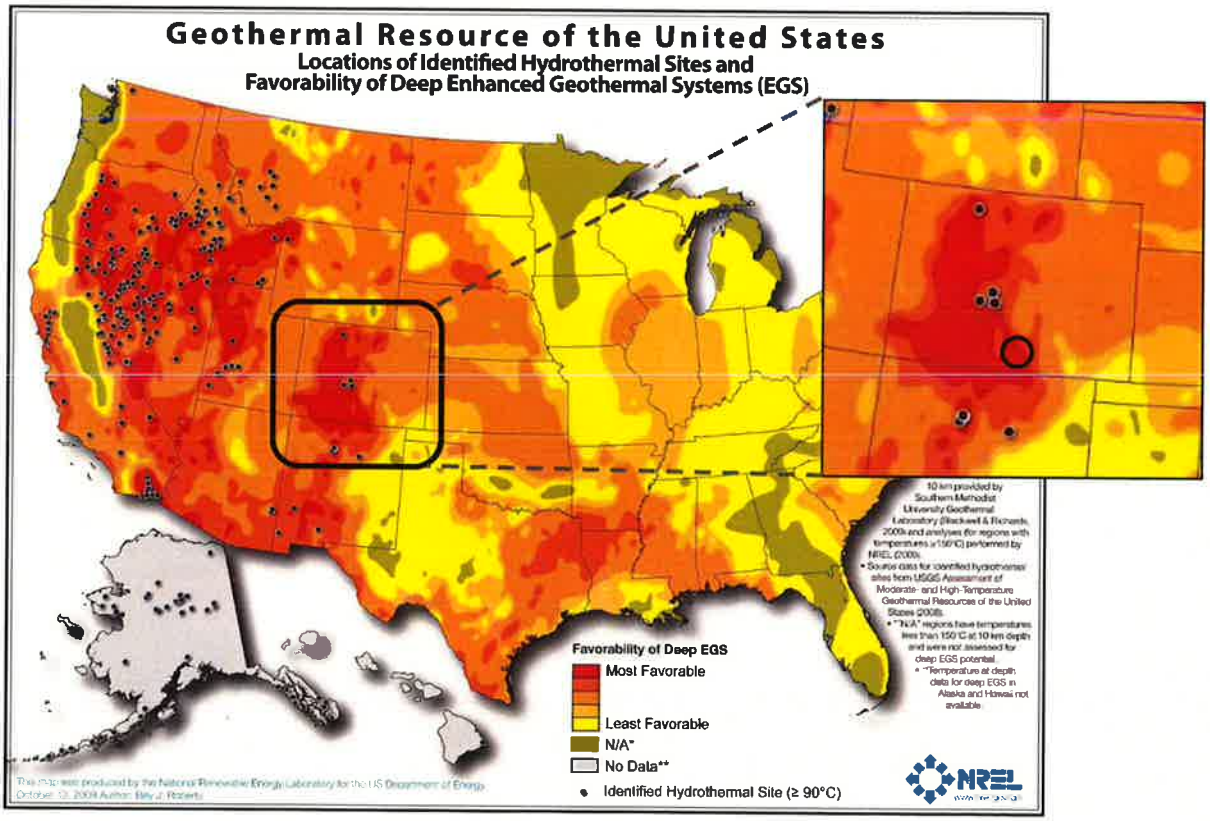


○ - Trinidad, CO

Solar Power Resource Map

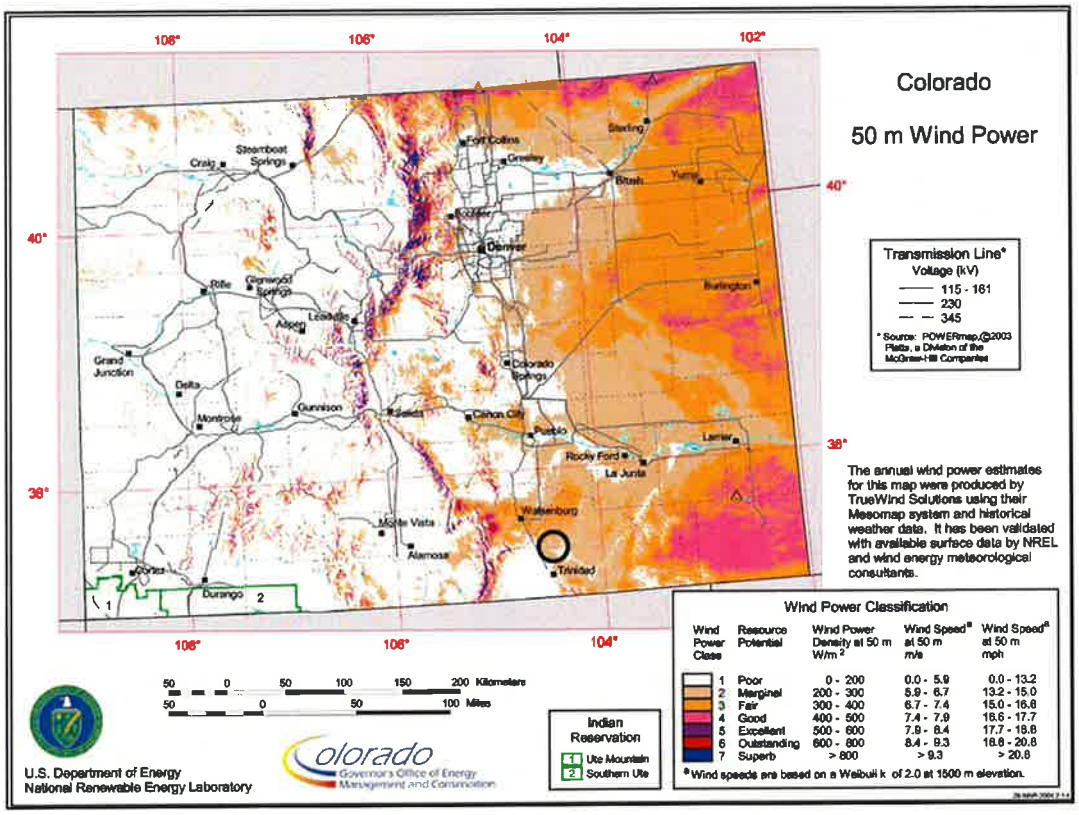


Geothermal Resource Map

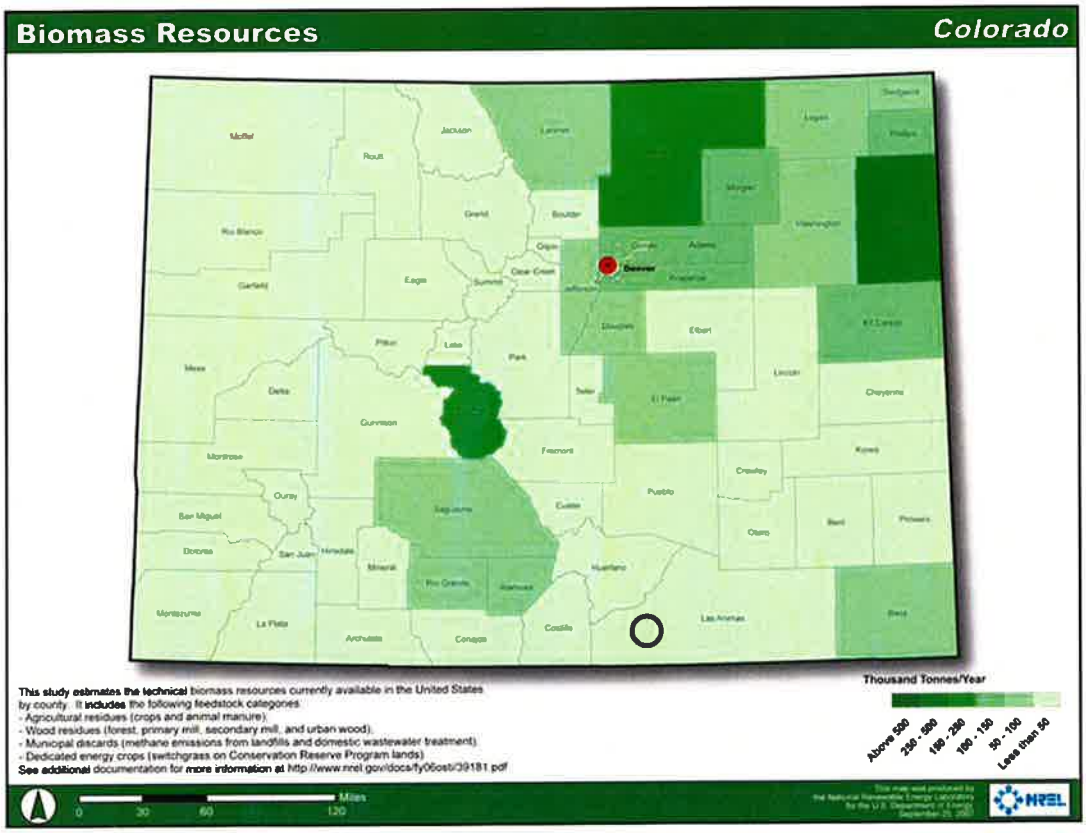


○ - Trinidad, CO

Wind Power Map



Biomass Resource Map



IV. District Demographics

Demographics of Student Body

Demographic	Total (2016-17)
Total District Boundary Population**	9,397
Total Trinidad, CO County Population*	8,103
Total Las Animas County Populations**	14,082
Total School District Student Count***	1,040
Total Hispanic Student County***	764 (73.5%)
Total Caucasian Student Count***	239 (23%)
Total Other Minority Student***	37 (3.5%)
Free or Reduced Lunch***	780 (75%)

*United States Census Bureau
** DOLA 2016
***cde.state.co.us/schoolview

Trinidad, CO Demographic Overview

Median Population Age: 40.4

Median Household Income: $43,819

Median Property Value: $136,500

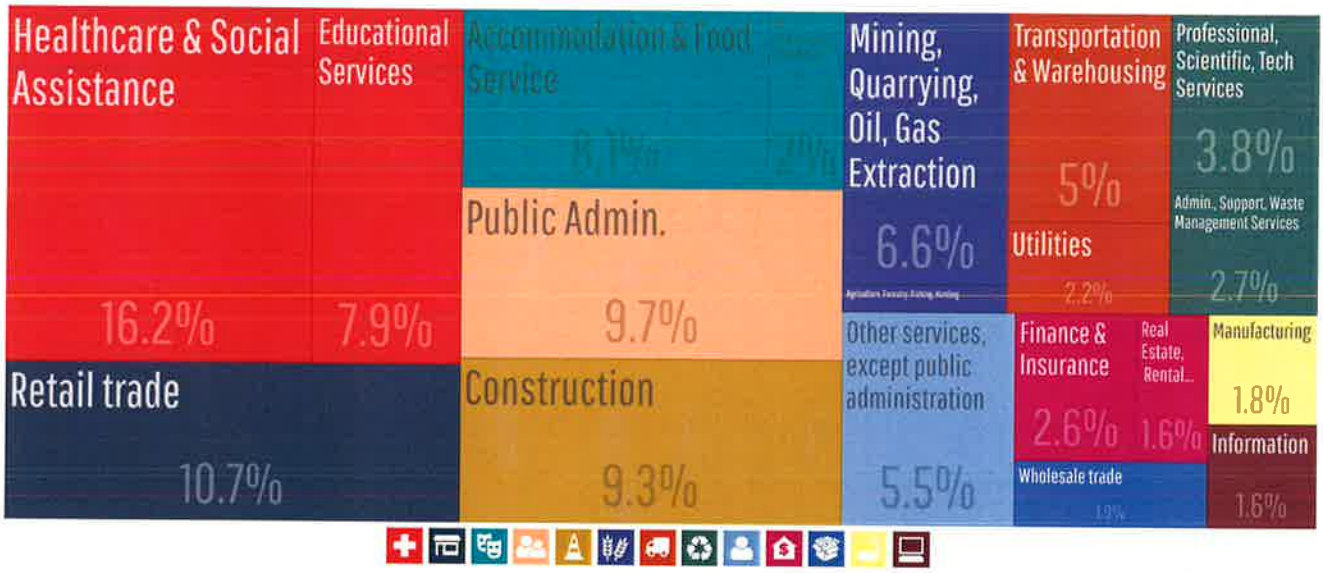
Educational Attainment: 83.9% (high school graduate or higher)

Trinidad & Las Animas County Economics

The most common industries in Trinidad, CO (by number of employees) is Healthcare & Social Assistance (16.2%), Retail Trade (10.7%), Public Administration (9.7%), and Construction (9.3%).

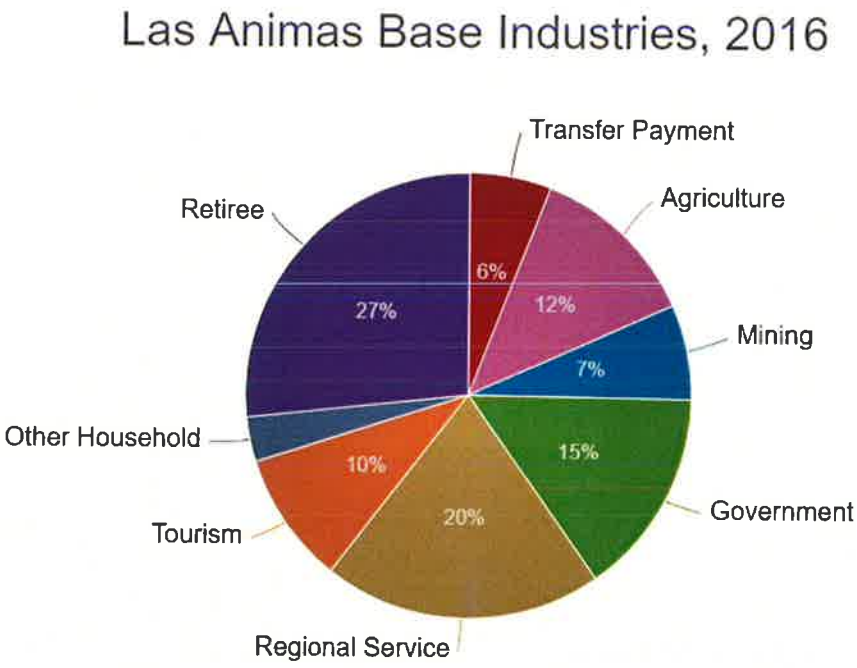
Historically, the oil & gas industry has been a major economic driver in the area, but like many communities, Trinidad & Las Animas County have been affected by the cycle nature of the price and production. The industry employs 6.6% of local residents with jobs, but is a sharp decrease from years past. Other notable industries that drive economic conditions include Accommodations & Food Services and Educational Services.

Trinidad, CO Employment by Industries



Dataset: ACS 5-year Estimate
Source: Census Bureau

DATA USA:



V. BEST Facility Assessment

During the Master Plan process, a thorough examination of the existing facilities was completed, including all major buildings and grounds. Each building was evaluated regarding health, life safety standards, structural soundness, the condition and operation of the HVAC systems and electrical systems. In addition, the academic and educational quality of the schools was analyzed.

Trinidad School District's facilities that were considered for this Master Plan consist of the three buildings that make up Trinidad High School, all portions of the Trinidad Middle School, Fisher's Peak Elementary School, and Eckhart Elementary School.

The District also has an auto shop building, a maintenance shop housed in the Middle School's old boiler building, a small building used for storage that formerly housed a daycare program, an athletic support facility adjacent to the bleachers overlooking the track and football field that were not assessed and are not included in this master-planning effort.


Eckhart Elementary School


Fisher's Peak Elementary School


Trinidad Middle School


Trinidad High School

Trinidad 1 School District Property Assessments

Trinidad Middle School was built in four phases. The original, three-story building was constructed in 1911 and was originally a High School. In 1922, a gym and auditorium were added. In the 1960s, a separate elementary school building was constructed nearby, originally called the Park Street School. In 1993, the Park Street building was connected to the 1911 and 1922 portions of the building and a cafeteria and additional gym was added in a massive renovation effort.

The High School's three buildings were all built in 1972, and no additions or major renovations have occurred on this building. The original wing of Eckhart Elementary was constructed in 1964 and an addition in 2002 added more classrooms and a gym to this school. Fisher's Peak Elementary is the newest school in the District's inventory and was built in 2002. Overall, the condition of the Middle School is poor, while the conditions of the other schools are generally good, although some of their systems and educational spaces are in urgent need of repair or replacement.

The following tables outline the recommendations made in the 2018 BEST Facility Assessment as well as the recommendations made by the Master Planning team. Table text format meanings are as follows:

1. Rows designated with **bold, dark blue text** indicate recommendations made by Master Planning team that were not in the 2018 BEST Facility Assessment.
2. Rows designated with a light grey background indicated recommendations made in the 2018 BEST Facility Assessment that are not recommended by the Master Planning team
3. All other rows have recommendations that are consistent between the 2018 BEST Facility Assessment and the Master Plan.

Trinidad Middle School Assessment & Recommendations

TABLE KEY:		
	Dark Blue Text	Included in CDE Assessment but Not Master Plan
	Grey Shaded Cells	Included in Master Plan but Not CDE Assessment
	Other Cells	Included in Both

Building Component	Recommendation / Need	2018 CDE Required Cost	Master Plan Budget	Comments
ADA Accessibility Life Safety Fire Protection	Code compliant Fire Rated Doors Building Wide	$85,900	$112,724	
	Install Reliable VOIP System		$12,981	Master plan recommends using the ethernet infrastructure for VOIP.
	Phone System Renewal	$202,340		Installing dedicated phone lines is not warranted
	ADA Compliant Sidewalks Outside 1922 Gym		$22,041	CDE recommends new sidewalks around the entire building. Refer to site component projects.
	Building-Wide ADA Compliance & Modern Safety Standards Upgrades		$25,145	
	ADA Compliant Bathrooms Building Wide		$339,331	The CDE estimate to replace bathroom fixtures may include ADA upgrades. Unclear from written assessment.
	ADA Access Ramp to Basement Rooms		$9,616	
	Install Fire Suppression System in 1964 Building		$739,685	
	Upgrade Fire Alarm System in 1909 Building	$735,782	$758,283	
	Correct Fire Suppression Deficiencies in 1909 Building		$109,896	
Building Envelope	Tuckpoint Exterior Façade of 1909 Building	$415,817	$608,678	
	Replace Windows Throughout the Building	$664,570	$833,216	
	Gutters and Downspouts Renewal	$12,933	$7,780	Master plan recommends drainage improvements around the auditorium. CDE recommends new downspouts around the entire building.
	Replace Corroded Lintels		$613,553	
	Replace Deteriorated Sandstone Sills		$462,701	
	Roof Renewal - Park St, 1993 Addition, 1926 Auditorium	$1,556,195		Maintenance staff did not flag roof as an urgent need.
	Exterior Walls - Rigorous Structural Evaluation			Included in the Master Plan Cost to remediated below grade walls.
	Replace 1909 Terra Cotta Roof	$402,974		Maintenance staff is working through an insurance claim to replace damaged tiles. A complete replacement of the roof is not an urgent need at this time.
	Metal Pipe Railings Renewal	$36,934		
Building Program & Function	Ethernet Infrastructure Upgrade	$611,763	$482,084	
	Smart Classroom Implementation		$756,156	
	New, Modern Data Center		$396,552	This is an urgent need that was identified by the district IT director.
	Strengthen WIFI Network		$57,792	This is an urgent need that was identified by the district IT director.

	New Intercom System	$35,811		
	1993 Gym Scoreboard Renewal	$12,436		
Building Structure	Remediate Below Grade Walls Around 1909 Building and Auditorium	$47,712	$1,315,258	The Master Plans budgets for much more comprehensive remediation of the below grade walls. This is a conservative estimate until a more rigorous structural study can be performed.
	Slab Remediation	$30,692		
	Wood, Brick, & Steel Structure Renewal	$105,480		The building structure was observed to be in good condition. It is old, but the large amount of work identified by CDE is not warranted at this time.
	Park Street Stairs Renewal	$9,292		
Electrical	Replace Generator & Add Servers to Back-up Circuit	$67,464	$129,527	The Master Plan also budgets money to add the server equipment to the generator.
	Add Additional Outlets in Classrooms		$32,297	
	Building-Wide LED Retrofits	$587,055	$312,134	CDE budgets for new LED fixtures. The Master Plan recommends LED tube retrofits because the existing fixtures are in serviceable condition.
	Electrical Renovation	$955,302	$211,919	CDE budgets money for a comprehensive electrical renovation of the entire building. The Master Plan budgets for a comprehensive electrical renovation of just the 1964 building. The 1909 classrooms will just receive additional outlets. The HVAC project recommended in the Master Plan will include significant upgrades to the 1909 electrical systems.
	New Stage Lighting	$182,265		
	Theater Curtains - Electrically Operated Renewal	$12,823		
Hazardous Materials	**Remediate Asbestos as Needed for New Work**		$303,504	This work is very difficult to estimate. The Master Plan includes a conservative estimate for remediating asbestos as needs for the HVAC renovation. Much of the asbestos is located in the 1964 building.
HVAC	**Classroom Air Source VRF w/ DOAS & Controls**		$4,615,853	
	Install High Efficiency RTUs w/ Cooling	$1,556,784		The Master Plans recommends a VRF system instead of new packaged equipment throughout the 1909 building.
	Install High Efficiency Gym RTU Unit w/ Cooling		$104,785	
	High Efficiency Cafeteria RTU w/ Cooling	$63,331	$89,585	
	Fix Bathroom/Lab/Janitor Closet Ventilation Fans		$4,908	
	Replace Exhaust Systems Building Wide	$277,042		CDE calls for comprehensive exhaust fan replacements. The Master Plans calls for more modest exhaust fan replacements.
	Replace Fintube heaters and Hot Water Hydronic Piping	$1,272,221		The Master Plan recommends replacing the hydronic heating system with a VRF system.
	Gas Fired Unit Heaters	$40,949		
	New HVAC Controls	$144,166		Controls cost is wrapped into air source VRF recommendation above.

Interiors	Replace Failing Floor Tiles/Repair Subfloor as Needed			
	Replace Failing Floor Tiles/Repair Subfloor as Needed in 1993 Areas	$181,571	$247,206	
	New Space Signage	$112,249		
	1909 Interior Stairs Renewal	$14,714		
	1993 Carpet, Ceramic Tile, and Concrete Floor Renewal	$440,612		
	2012 Vinyl Tile and Carpeting Renewal	$213,922		
	Ceiling Renewal Building Wide	$147,821		
	Fixed Casework Renewal Building Wide	$307,945		
	Gym Seating Renovation	$43,315		
Plumbing	Upgrade All Bathroom Fixtures		$57,339	Master plan recommends retrofitting existing fixtures with higher efficiency flush valves and faucets.
	Utility Sinks Renewal	$63,201		
	Laboratory Sinks Renewal	$5,973		
	Locker Room Shower Replacements	$119,019		
	Replace Restroom Fixtures Building Wide	$478,491		
	Replace Emergency Shower Units	$4,412		
	Replace Water Coolers	$43,747		
	New Domestic Water Booster Pump	$152,885		
	Renew Domestic Water Distribution Piping 1964 & 1993 Areas	$297,364		
	Replace 100 Gallon Domestic Hot Water Heater	$18,993		
	Renew Domestic Water Distribution Piping 1909 Areas	$218,682		
	Investigate Domestic Water Quality	$9,230		
	Replace Gravity Discharge Sewer Line	$170,434		
	Improve Roof Drainage in 1964 Building	$95,834		
Security & Access Control	Implement Continuous Live Monitoring Camera System/Expand Exterior Coverage	$95,487	$49,542	CDE calls for a comprehensive replacement of the existing system. The Master Plan recommends expanding the existing system.
	Secure Entry Vestibule for Main Entrance		$331,176	This was a priority need emphasized by the district.
	Secured Access Doors & Hardware		$27,242	
	Security System - Card Access System Renewal	$6,705		The secured access doors and hardware will include the renewal of the card access system recommended by CDE.

Site	**Replace West & South Parking Lots**		$1,050,644	Will address many of the parking lot projects flagged by CDE.
	Traffic Control - Painted Pavement Markings Renewal	$12,848		
	Parking Lot and Roadway Pavement - 1963 Intermediate Renewal	$102,879		
	Parking Lot and Roadway Pavement - 1963 Surface Renewal	$227,794		
	Curbs, Rails and Barriers - Cast-In-Place Concrete Renewal	$52,802		
	Parking Lot - Traffic Control - Painted Pavement Markings Renewal	$3,471		
	Pedestrian Pavement - Concrete Renewal	$449,261		
	Water Supply - Potable Water Distribution Piping Renewal	$25,982		
	Water Supply - Fire Protection Distribution Piping Renewal	$45,260		
	Sanitary Sewer - Waste Water Piping Renewal	$2,758		
	Storm Sewer - Concrete - RCP - New Renewal	$17,474		
	Fuel Distribution - Gas Service Piping - 4" Steel Renewal	$30,897		
	Site Electrical Distribution - Underground Power Distribution - 1000kVA Pad Mounted Transformer Renewal	$75,108		
	Site Lighting - Poles - Wood Renewal	$5,168		
	Site Lighting - Site Lighting Controls - Photocell & Time Clock Renewal	$4,765		

CDE Requirement Costs Total:	$14,425,106
CDE Replacement Cost Total:	$28,645,749
Master Plan Recommendation Cost Total:	$15,231,133

CDE FCI Score:	0.50
FMMP FCI Score:	0.53

TABLE KEY:

Dark Blue Text	Included in CDE Assessment but Not Master Plan
Grey Shaded Cells	Included in Master Plan but Not CDE Assessment
Other Cells	Included in Both

VI. Educational Programming & Adequacy

Trinidad 1 currently offers programming at the Elementary, Middle, and High School levels that are primarily consistent with the Colorado Academic Standards at:

- Comprehensive Health and Physical Education
- English Language Proficiency
- Mathematics
- Music K-12
- Reading, Writing, and Communicating
- Science
- Social Studies
- Visual Arts
- World Languages

Adequacy

Programs Currently Within Colorado Model Content:

Health and Physical Education, English, Mathematics, Music, Reading and Writing, Science, Social/ Studies, Art, and World Languages.

Programs Currently Offered Outside Colorado Model Content:

Vocational Programming: Wood Shop, Basic Shop, and Welding

Programs Desired but Not Currently Offered:

- Advanced Placement Courses
- ELL Duel Language
- Gifted & Talented Offerings
- Computer Classes
- After School Programs
- Vocational Agriculture Program
- District On-Line School
- District Alternative School
- Blended Learning Classes
- STEM Labs

VII. Complete Inventory of Facilities

Facility Inventory

The first table below identifies each building assessed in the master plan. The areas represent the total current area of the building, including all additions. The second table below provides information on all major additions that make up each facility.

Building Name	Address	Use	Ft²	Year Built	Construction
Eckhart Elementary	1021 Pierce St.	Grades K-1	25,844	1964	CMU block w/ face brick & built-up roof
Fisher's Peak Elementary	900 Moore's Canyon Rd.	Grades 2-5	45,630	2002	CMU block w/ face brick & built-up roof
Trinidad Middle School	607 Miner Dr.	Grades 6-8	40,591	1911	Brick w/ clay tile roof
Trinidad High School	816 West St.	Grades 9-12	122,414	1972	CMU block w/ face brick & built-up roof

Additions	Year	Ft²	Use	Construction
Eckhart Elementary School	2002	11,412	Classrooms	CMU block w/ face brick & built-up roof
Trinidad Middle School	1922	23,868	Gym Auditorium	Brick w/ clay tile roof
	1964	20,882	Classrooms	CMU block w/ face brick & built-up roof
	1993	30,317	Gym Cafeteria Atrium Classrooms	CMU block w/ face brick & built-up roof

Site Maps & Floor Plans

Eckhart Elementary School Site Map

2002 Building Exterior

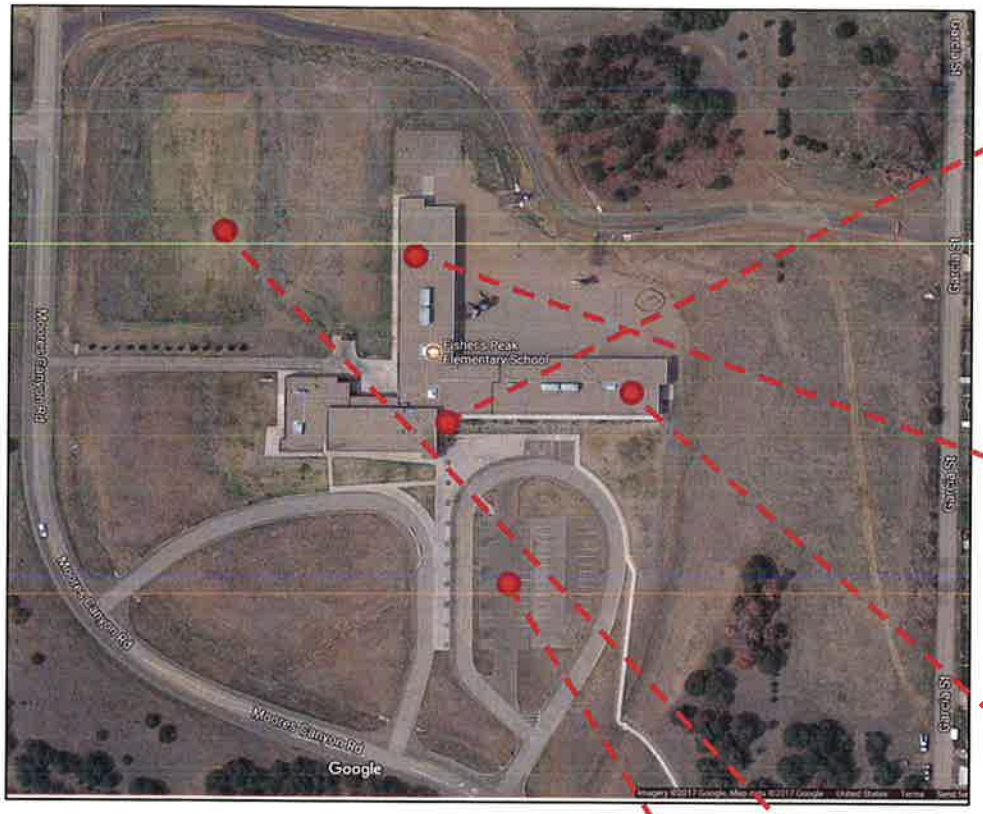
1964 Building Exterior

Exterior Modular Buildings

Eckhart Elementary School Facility Floor Plans

The following scale floorplans represent the room layouts and functions as of 2017:

Fisher's Peak Elementary School Site Map



Main Entrance

North Wing Classrooms

East Wing Classrooms

Playground/Sports fields

Parking Lot

Fisher's Peak Elementary School Facility Floor Plans

The following scale floorplans represent the room layouts and functions as of 2017:

FISHER'S PEAK ELEMENTARY

Trinidad Middle School Site Map

1911 Original Construction

Main Entrance

Northeast Exterior

Southwest Exterior

1922 Additions

East Addition

West Addition

1964 Park St. Addition

Park Street Main Entrance

East Exterior

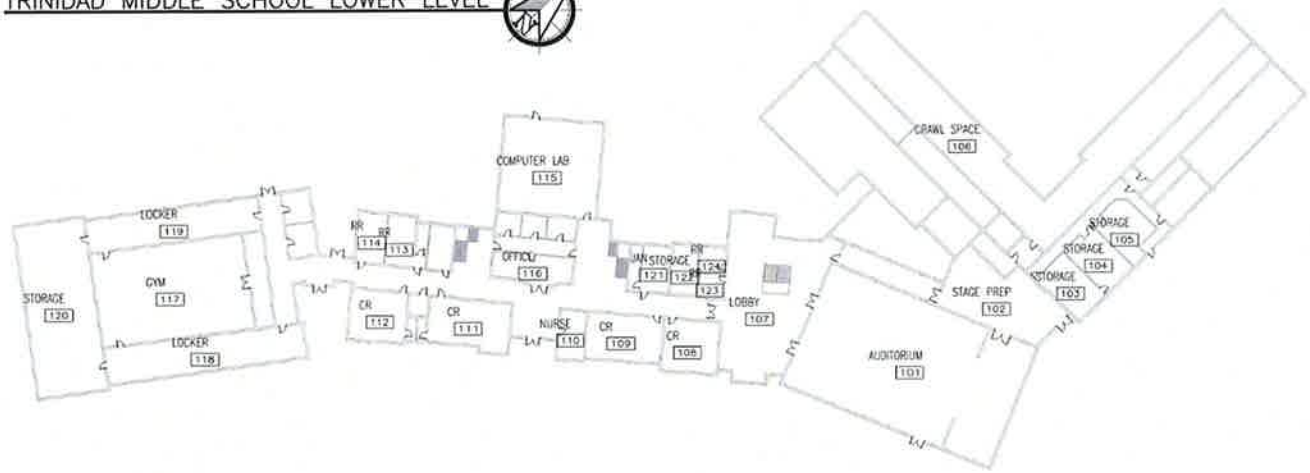
1993 Additions

Cafeteria Addition

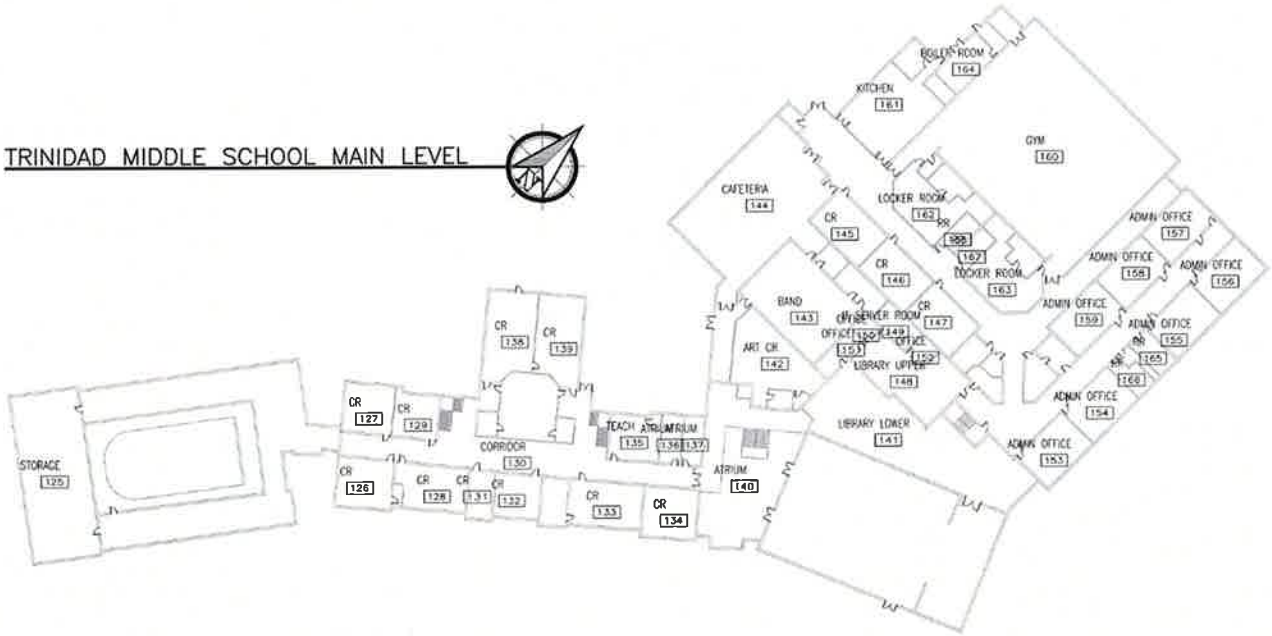
Atrium connecting 1922 Addition

Trinidad Middle School

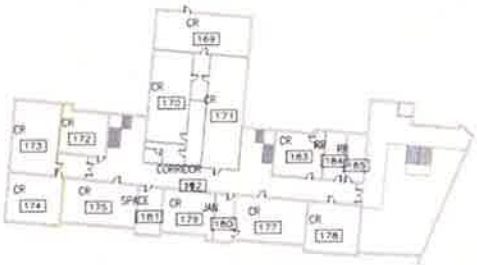
TRINIDAD MIDDLE SCHOOL LOWER LEVEL



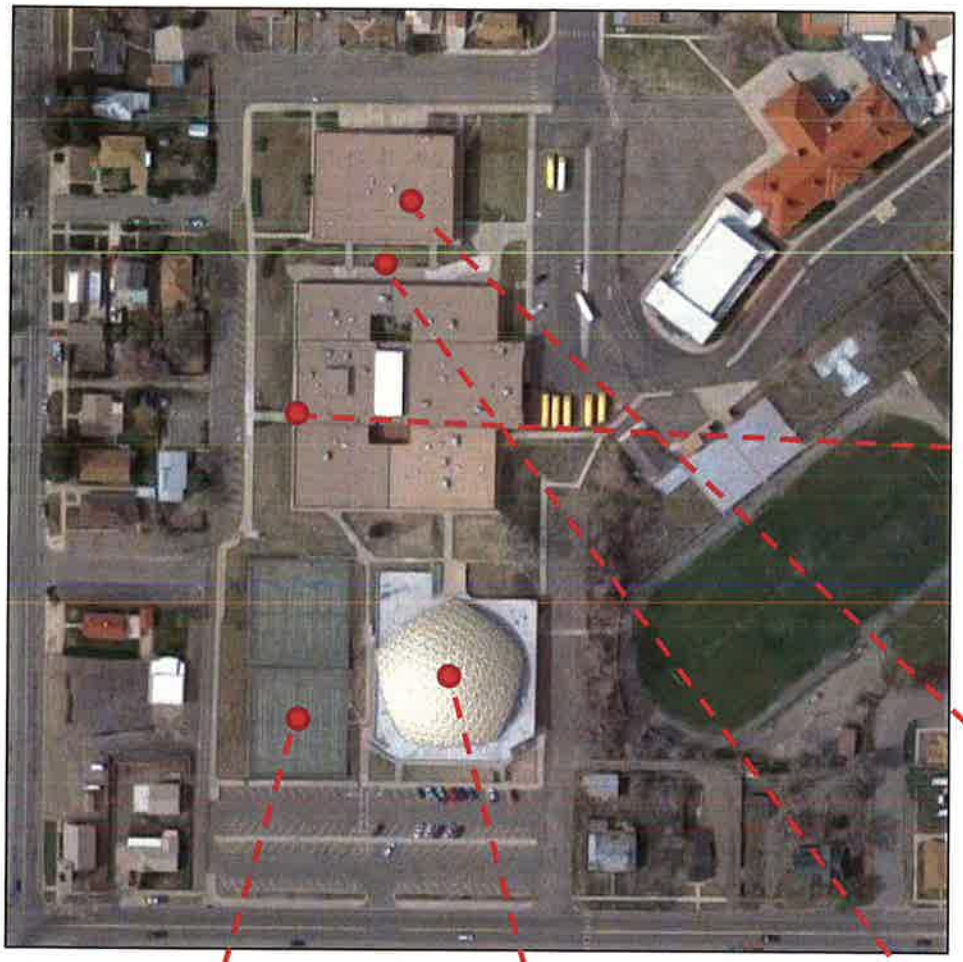
TRINIDAD MIDDLE SCHOOL MAIN LEVEL

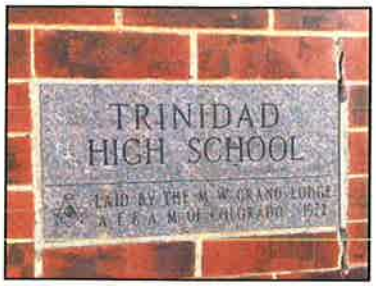


TRINIDAD MIDDLE SCHOOL UPPER LEVEL



Trinidad High School Facility Site Map

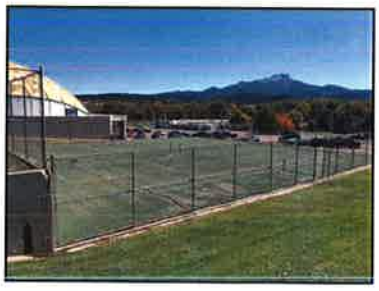




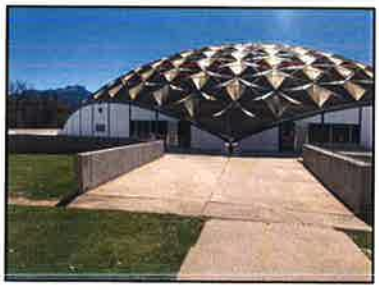
Built in 1972

High School Main Entrance – Building A

High School Building B



Tennis Courts



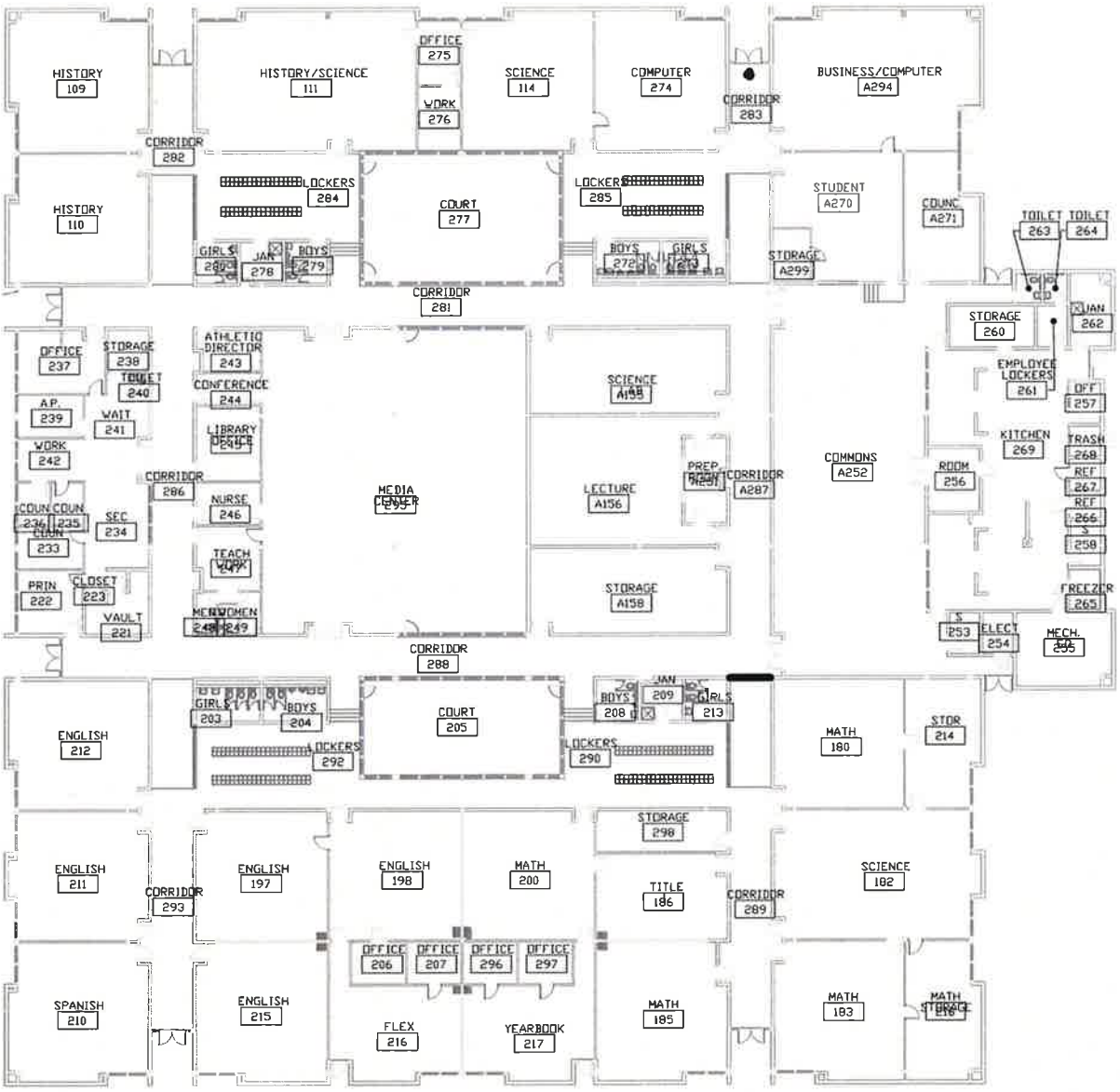
High School Gym

Secured courtyard between Buildings A&B (looking towards Building A)

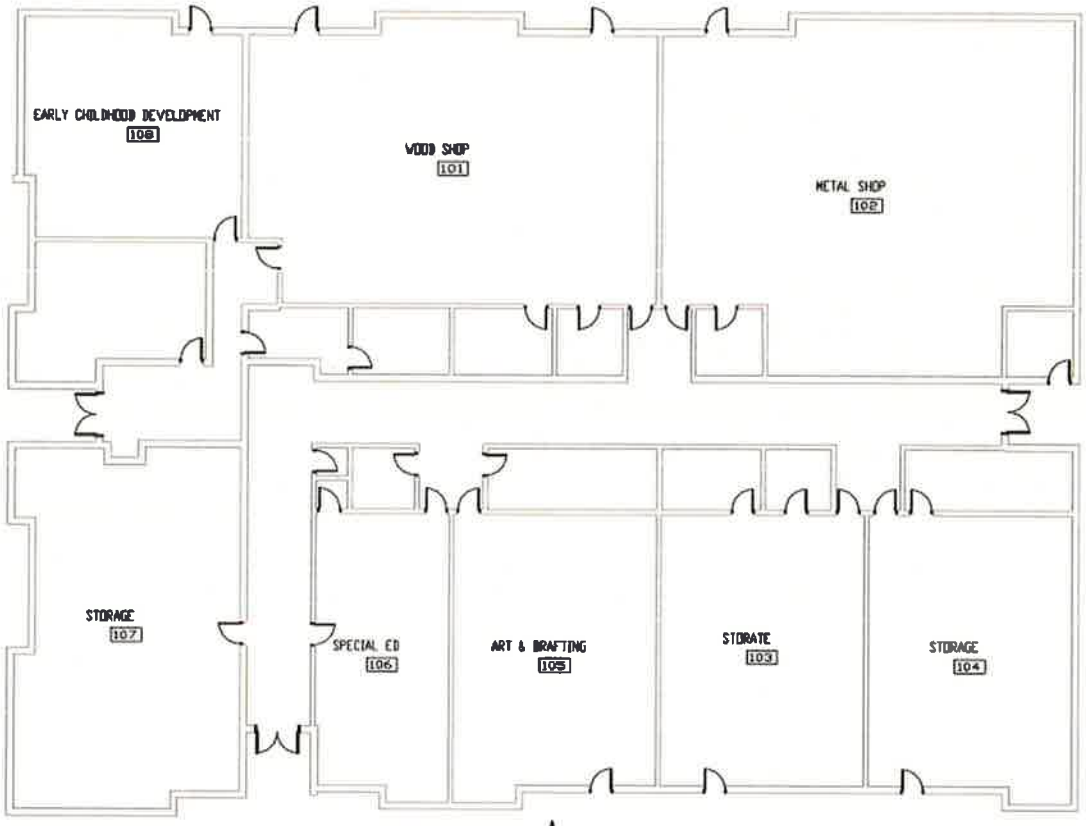
Trinidad High School Facility Floor Plans

The following scale floorplans represent the room layouts and functions as of 2017:

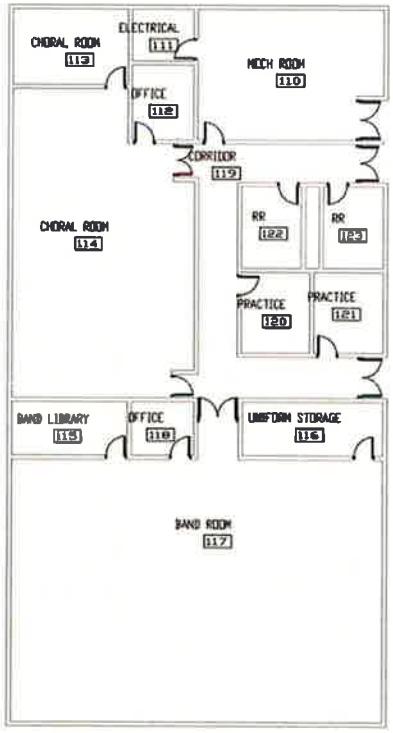
[Trinidad High School Building A]



Trinidad High School Building B – Top Floor & Basement Level

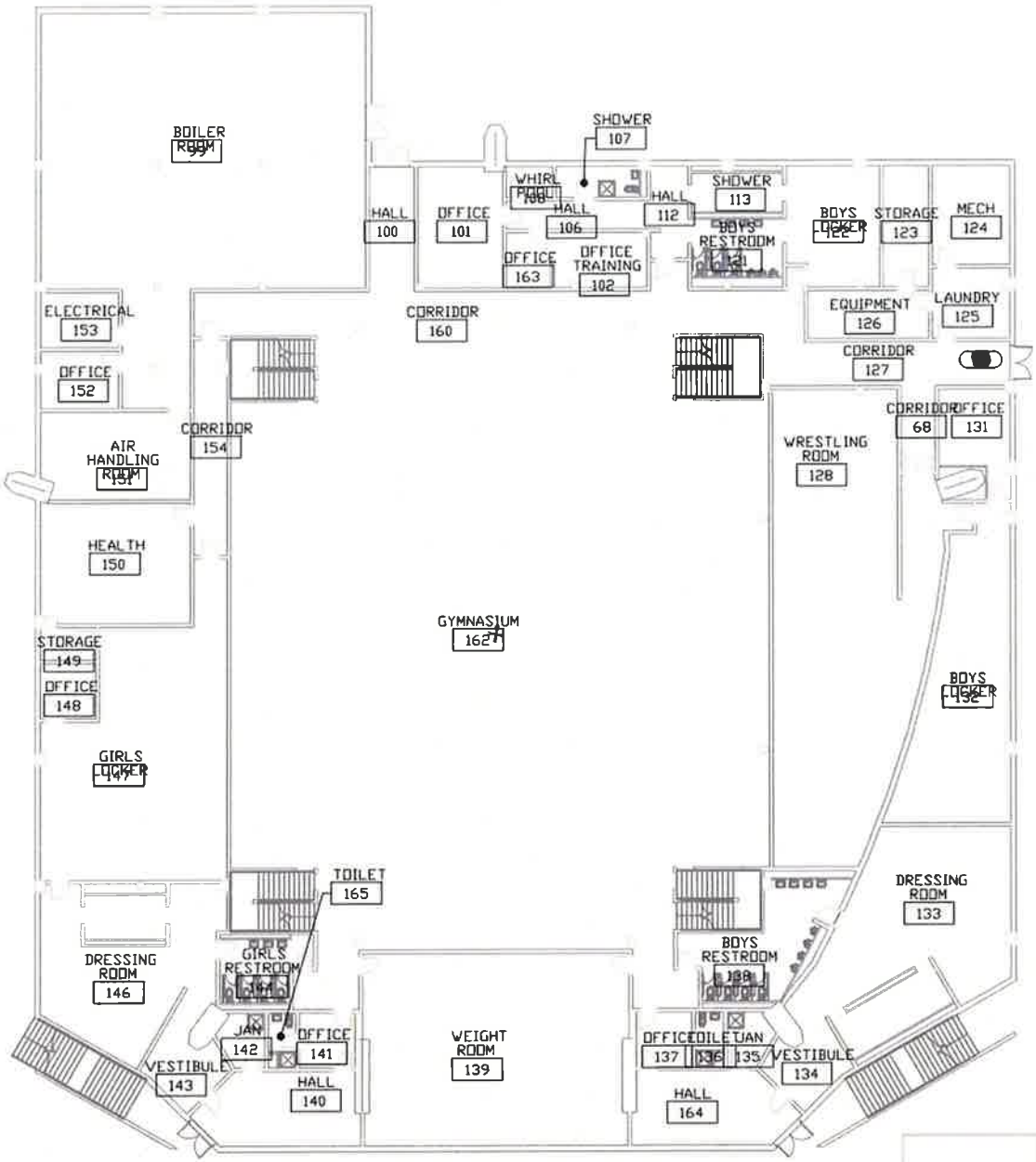


HIGH SCHOOL B BUILDING TOP FLOOR



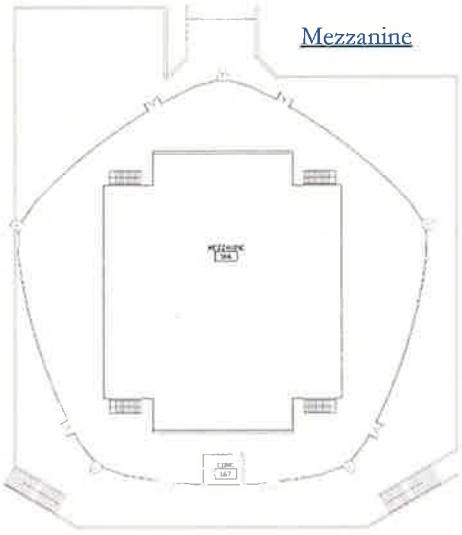
HIGH SCHOOL B BUILDING BASEMENT

Trinidad High School Gym



TRINIDAD HIGH SCHOOL GYM

Mezzanine



VIII. Facility Evaluation & Analysis

Trinidad Middle School

General Building Information

Trinidad Middle School is the oldest facility in the district. The original building was constructed in 1911 and is approximately 41,000 square feet spread over three floors. This area contains most of the classrooms. A pool, gym, and auditorium were added in 1922. The 1922 additions grew the Middle School by approximately 24,000 square feet.

In 1964, another facility, Park Street Elementary, was constructed close to the Middle School. It is approximately 20,882 square feet. In 1993, the Park Street building was joined to the 1911 and 1922 facilities with a large atrium. Additionally, a new gym, cafeteria, and library were added to the school. The 1993 renovation added approximately 30,000 square feet to the Middle School. Today, the total area of the Middle School is approximately 115,600 square feet. Many building systems have fallen victim to deferred maintenance and have significant needs.

- 1911 – Original Construction
- 1922 – East & West Additions
- 1964 – Park St. Addition
- 1993 – Atrium, Cafeteria, Gymnasium Additions

Historic front entrance of the Middle School

Atrium connecting 1922 Addition

1964 Addition on Park Street

Cafeteria Addition

Water is infiltrating the below grade walls in the 1911 and 1922 buildings causing damage to interior finishes

The underlying foundation walls still appear to be in good condition in the few areas where they could easily be seen

Interior crawlspace showing below grade walls and floor joists

Signs of exterior foundational decomposition

Building Structure

1911 & 1922 Construction

The 1911 and 1922 portions are built on concrete footings with a crawlspace under the structure. Since the facility is on a slope, some of the first-floor walls are concrete foundation walls. Unfortunately, the below grade walls were not built with proper vapor barriers and there is evidence of water infiltration through these walls. It is unclear how much damage the foundation and below grade walls have sustained due to water damage.

In the limited area of the crawlspace visible through an access trapdoor in one of the classrooms in the southeast corner of 1911 portion of the building, there does not appear to be any serious water damage to the foundation wall. However, on all below-grade walls along the northwest side of this original building, along with the below-grade walls beneath the auditorium stage, there is extensive evidence of water infiltration and water damage of the interior plaster surfaces.

One portion of such walls on the northwest side of the first-floor computer rooms has already had some remediation performed by excavating on the outside of this wall and installing a moisture barrier. The interior of this particular wall also had a partial framed wall added to hide the moisture damage that had already occurred. This may be an issue because further damage cannot be easily identified.

Proper vapor protection will need to be installed around all below-grade walls, which will require a significant amount of excavation around the building perimeter.

1964 Addition

This addition constructed in 1964 has a full basement. Its structure is in good condition.

1993 Additions

The 1993 additions have modern structures that conform to more rigorous building codes. These structures are in good condition.

Structural deficiencies and recommendations are summarized below:

- There is evidence of excessive water infiltration through the foundation walls of the 1911 and 1922 structures and potential damage to the foundation. It is likely that proper vapor protection needs to be installed around the foundation which will require significant excavation.

Building Envelope

1911 & 1922 Construction

The 1911 and 1922 areas have a brick façade that is in dire condition. There is very little mortar left in the brick joints. Nearly the entire façade needs comprehensive repointing.

The windows in the 1911 and 1922 areas were replaced approximately 25 years ago. They are double-pane with aluminum frames and are in fair to poor condition. Many of the windows cannot lock open, and must be propped open with books if the occupants need fresh air.

The original 1911 building has a clay tile roof that is in good condition. The 1922 buildings have EPDM roofs that were observed to be in fair condition. Storm water drainage from the roof of the auditorium is directed out spillways or partial downspouts that make the water run down the southeast façade of the building rather than in downspouts all the way to ground level. Over time, this will lead to further, severe deterioration of the brick façade of this part of the building.

1964 Addition

The 1964 addition has a brick façade that is still in adequate condition. The classrooms have original single pane aluminum framed windows that are in poor condition. Additionally, there is a large amount of glass block in the classroom exterior walls. Although great for natural light, the glass block results in poor thermal comfort in the spaces. The blocks get very cold in the winter and very hot in the summer.

The building has a modified bitumen roof that is in serviceable condition.

1993 Additions

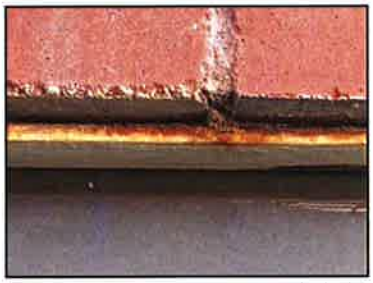
The 1993 additions have brick facades that are in good condition. Additionally, the double pane aluminum framed windows in the 1993 wings are in good condition.

The 1993 gym and cafeteria addition have ballasted built-up roof that is in serviceable condition.

Envelope deficiencies and recommendations are summarized below:

- The brick façade of the 1911 and 1922 exterior is in very poor condition. Comprehensive tuck pointing is recommended.
- The windows in the 1911 and 1922 buildings are in poor condition and should be replaced as it related to outside air supply and ventilation.
- Downspouts that direct storm water drainage all the way to the ground should be installed on the southeast wall of the auditorium. Adjacent surfaces should be regraded for proper drainage away from the building.
- The windows and glass block in the Park Street addition are in poor condition and need to be replaced.

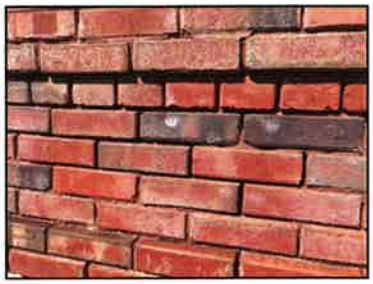
The 1911 Middle School received double pane aluminum frame windows over 25 years ago, but many of the window frames are in poor condition and are no longer operable



Extensive signs of deterioration of window lintels on 1911 portion of Middle School

Windows are typically propped open for outdoor air to combat comfort issues

The classrooms in the 1964 Park Street addition have a large amount of glass block



The brick façade of the 1911 and 1922 areas is in poor condition.

The 1911 building received an electrical upgrade in 1993. The sub-panels and main distribution panels are adequately sized and are in good condition.

Despite the 1993 electrical upgrade, many of the classrooms still have an inadequate number of outlets

Main Distribution Panel

The generator was installed in 1993 and has been unreliable for the district. It was unable to start during the most recent power outage.

Electrical and Distribution Systems

1911 & 1922 Construction

The 1911 and 1922 portions received an electrical upgrade at the time of the 1993 renovation. It received a modern main distribution panel, sub-panels, and wiring.

The system meets modern building codes and is safe to operate. Unfortunately, many classrooms in these wings lack the appropriate number of outlets for a modern classroom.

1964 Addition

The 1964 addition still utilizes the electrical system original to its construction.

This system is still functioning correctly, but the electrical needs of this portion of the building have exceeded its capacity and it is due for a comprehensive upgrade.

1993 Additions

The 1993 building has a modern electrical system that meets updated electrical codes. No changes are recommended for this portion of the building.

There is a backup generator located at the northwest corner of the 1993 gym, but it only powers an emergency lighting and fire suppression system and it usually does not work when there is a power outage.

The only server room for the entire district is also located in this building, and it has no backup power other than some UPSs that cannot provide service for a sufficient length of time.

Electrical deficiencies and recommendations are summarized below:

- The 1911 classrooms do not have sufficient outlets. Add more outlets to existing electrical circuits.
- The 1964 addition is still utilizing an electrical system original to its construction. This system cannot meet the current and future electrical needs of this portion of the building, and it does not meet current, acceptable electrical codes. It needs a comprehensive replacement.
- The backup power circuit of this building should be expanded to include the server room and any other critical loads.
- A modern and reliable generator needs to be installed.
- Due to the energy and utility savings potential, the existing fluorescent lighting systems is recommended to be replaced with more efficient LED systems.

Plumbing

Plumbing systems throughout the building are generally in good condition. All plumbing fixtures throughout the building are standard-flow with long flush rates.

Recommendation: Upgrade all plumbing fixtures to low-flow, high-efficiency fixtures.

Mechanical HVAC Systems

1911 & 1922 Spaces

The original 1911 building is served by hot water baseboard convectors located around the perimeter walls. The convectors and the hot water piping serving them were installed in 1993 at the time of the comprehensive facility renovation, and are in fair condition.

Classrooms in the 1911 building have no cooling which makes the building very uncomfortable in the spring and fall for all occupants. Additionally, no classrooms have mechanical ventilation, and subsequently, a majority of the windows do not open properly. Consequently, most classrooms are not receiving the code-required amount of fresh air and indoor air quality is suffering.

For the higher floors of the 1911 portion of the building, the only method for improving indoor air quality is to open windows on the southeast side of the building and turn on large, louvered ventilation fans on the northwest side of the building to exchange the air. However, this can only be performed when the building unoccupied and outdoor conditions are adequate.

Improving ventilation in the classrooms is an immediate need throughout the Middle School, and a significant health concern.

The offices on the first floor receive cooling from a ductless mini-split that is in serviceable condition. Exhaust of the restrooms and janitorial closets in the 1911 portion of the building all rely on the same set of squirrel cage fans in the attic that are not working. There is a vented experiment cabinet in the storage room adjacent to the science lab that is working, but the main exhaust fan for the room is tied into the same squirrel cage fans as the restrooms and closets and is not working.

A Johnson Controls system was installed during the 1993 renovation, but the maintenance staff cannot access it. As a result, all the heating equipment operates 24/7 during the winter which wastes a significant amount of energy. If the Middle School building is going to be utilized in the future, it needs a comprehensive HVAC renovation that provides cooling and ventilation for every classroom.

The 1922 auditorium is conditioned by a large rooftop furnace that was installed in 1993, and utilizes the same ineffective Johnson Controls system. At 23 years old, it is long past its ASHRAE recommended lifespan of 15-years and is due to be replaced.

The maintenance team cannot schedule the unit and they are unable to ensure it is always providing proper ventilation air. When the auditorium is full of spectators, it is imperative that the unit supply adequate outside air to the space, otherwise indoor air quality can degrade significantly.

Finally, the unit does not provide cooling to the auditorium, making the space very uncomfortable during shows when it is full of spectators and the high-powered stage lights are on. The auditorium needs a new high efficiency rooftop unit that provides cooling and utilizes demand control ventilation to ensure the space is always receiving the proper amount of ventilation air.

1993 atmospheric boiler

The classrooms in the 1911 building are conditioned by hot water baseboard convectors. None of the rooms have any cooling or mechanical ventilation.

The 1922 gymnasium and lockers rooms are conditioned by rooftop furnaces that are in poor condition. The building does not have any cooling.

Ductless mini-split serving office areas

The cafeteria and gymnasium in the 1993 building are conditioned by rooftop furnaces. They are over twenty years old and need to be replaced.

Ineffective pneumatic controls

Air compressor for pneumatic controls

1964 Addition

The 1964 addition is conditioned by hot water baseboard convectors installed in 1993. Like the 1911 classrooms, the spaces in this building does not have cooling and relies on problematic windows for ventilation.

The area needs a comprehensive HVAC renovation in conjunction with the 1911 portion of the Middle School.

1993 Additions

The 1993 wings are conditioned by a collection of different HVAC systems. The gymnasium and cafeteria are conditioned by large rooftop furnaces installed in 1993. Like the rest of the facility, the units utilize the ineffective Johnson control system and are likely operating 24/7. The furnaces need to be replaced with high-efficiency units that can provide cooling, are easily scheduled, and always provide proper ventilation.

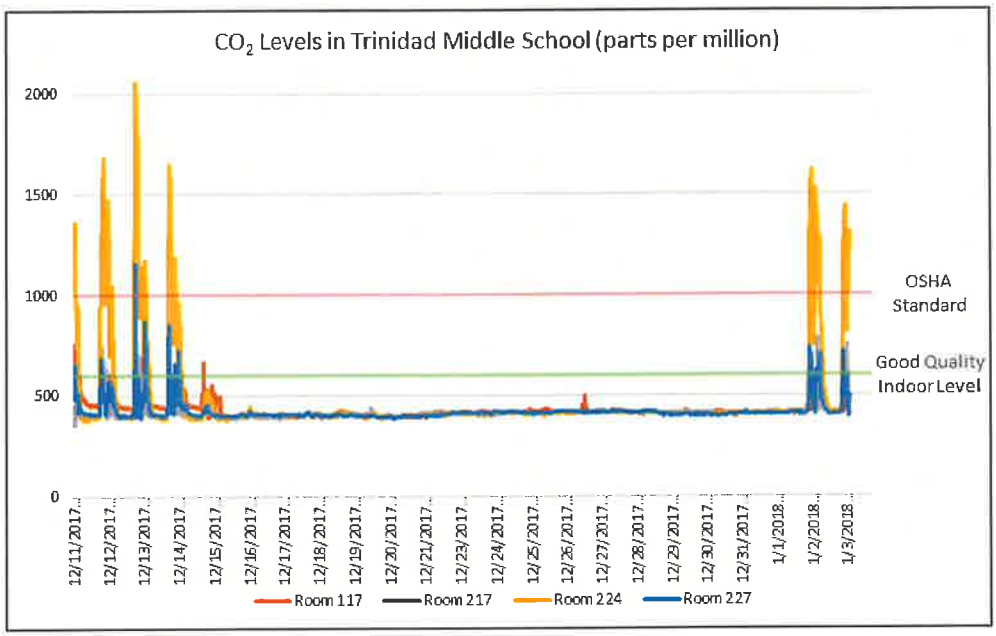
The 1993 classrooms utilize hot water cabinet heaters and fan coil units that are also subject to the cooling, ventilation, and control problems that plague the rest of the facility.

The 1993 mechanical room is located adjacent to the new gym. It contains the low-efficiency atmospheric hot water boilers that serve the 1993 wings, the 1964 Park St. addition, the 1922 additions, and the original 1911 construction. At 24 years old, the boilers are nearing the end of their ASRAHE recommend lifespan of 25 years and are due to be retired or replaced.

Carbon Dioxide Assessment

As part of this assessment, carbon dioxide (CO_2) sensors were placed in various classrooms around the Middle School to measure the air quality in this building where a comprehensive HVAC project is being recommended to get a sampling of the building's current air quality. These classrooms were 117, 217, 224, and 227.

The sensors were placed in these rooms and recorded CO_2 levels every 15 minutes from December 11th, 2017 to January 3rd, 2018. The data they collected are presented in the below graph for easy visual evaluation:



Carbon Dioxide Measurements Key Metrics

- CO_2 concentrations are measured in parts per million (PPM)—that is the number of CO_2 molecules that are found in one million molecules of air.
- CO_2 concentration levels that match outdoor conditions are the lowest that should be possible in an indoor space, and this is typically around 450 PPM.
- Normally, concentrations of CO_2 at or below 600 PPM are considered good indoor air quality.
- The maximum allowed concentration of CO_2 that can be designed for supplying ventilation air according to OSHA and ASHRAE standards is 1,000 PPM.
- At concentrations above this level, building occupants begin to experience decreased levels of performance, concentration, and productivity and temporary physical symptoms such as headaches, drowsiness, and eye or throat irritation which should resolve quickly after being removed from the exposure.
- At concentrations above 2,500 PPM, occupants can begin to experience longer-term adverse health effects that do not resolve immediately when they are removed from the unhealthy exposure.

The classrooms in the 1911 building are conditioned by hot water baseboard convectors. None of the rooms have any cooling or mechanical ventilation.

The 1922 gymnasium and lockers rooms are conditioned by rooftop furnaces that are in poor condition. The building does not have any cooling.

The 1911 Middle School received double pane aluminum frame windows over 25 years ago. Many of the window frames are in poor condition and can no longer open.

Windows are typically propped open for outdoor air to combat comfort issues

Conclusion

The graph above demonstrates that the majority of the 1911 portion of the Middle School is likely not receiving adequate levels of ventilation air to maintain indoor air quality at levels within OSHA and ASHRAE standards on almost every day that the building is occupied.

The rooms with CO_2 concentrations that are close to or within acceptable standards are rooms whose teachers reported more frequently using the operable windows regardless of the ambient air temperature outside. Those rooms with teachers who are probably more sensitive to the thermal discomfort that results from opening windows regardless of outside air temperature are the rooms that have notably worse air quality.

This method of relying only on operable windows (which are largely broken throughout this building) and the discretion of individual room occupants who can be sensitive to thermal discomfort to supply fresh ventilation air is not sufficient to ensure that all occupants are receiving appropriate levels of ventilation air.

A new HVAC system that is properly designed and operated to maintain acceptable levels of CO_2 concentrations is needed in this building to correct the problem and should be planned for immediately and implemented as soon as possible to ensure the health and optimal performance of the faculty and students of the Middle School.

Mechanical HVAC System deficiencies and recommendations are summarized below:

- The entire Middle School lacks cooling, proper ventilation, and a modern building management system. A comprehensive HVAC renovation is highly recommended for the entirety of this facility.
- The fans providing exhaust ventilation for the restrooms, janitorial closets, and science lab storage room of the 1911 portion of the building need to be replaced.

Interiors

Interior spaces vary by the age of construction:

1911 & 1922 Spaces

The subfloors in several rooms on multiple stories of the 1911 portion of the building show noticeable sagging and deteriorated plywood is visible in some closets and storage rooms. The limited floor joists visible in the crawlspace and the ceiling joists and rafters in the attic all appeared to be in good condition. Floor tiles throughout the two higher floors of the 1911 portions of the building are failing and need to be replaced with a more flexible flooring system suitable for the plywood subfloors used on these stories.

The subfloor in some of the 1911 rooms has been damaged and needs to be replaced.

The science lab storage room has a small concrete pad with a drain under the emergency shower, but there is extensive water damage to the floor around the shower, likely indicating that this small pad is not sufficient to hold and drain the water when the shower is used.

Joists seem to be in good condition

Above the light booth in the auditorium, there was a water leak from equipment on the roof, which has caused water damage on some of the ceiling joists and decorative ceiling panels. The joists need to be checked for mold and integrity and remediated if needed, and the damaged ceiling tiles replaced.

Interior deficiencies and recommendations are summarized below:

- Replace the failing tile floors throughout the 1911 portion of the building with a more flexible flooring system.
- During the floor-replacement project, identify and replace all failed subfloors throughout the 1911 portion of the building.
- Replace the water-damaged floor in the science storage room and install a more appropriate shower floor and drain under the emergency shower.
- On the water-damaged ceiling joists above the light booth in the auditorium, check for mold, remediate if necessary, repair any structurally-significant water damage, and replace the affected decorative ceiling tiles.

Water-damaged ceiling joists above auditorium

ADA Accessibility, Life Safety and Fire Protection

Fire Response System Issues

There is a fire suppression system installed in the 1911 and 1922 portions of the building only. This system is meant to have a dry-pipe in the attic of the 1911 building, but the dry valve is broken, so there is either water in the attic pipe that could freeze or the maintenance staff has simply shut off the valve to this portion of the system to avoid freezing, and therefore the top floor of the 1911 portion cannot be counted on to have reliable fire suppression.

The smoke evacuation system in the atrium is manually kept in the off position because the maintenance staff does not understand how this system is meant to work. There are smoke evacuation roof vents above the stage, but they are currently blocked by the current roofing system. There are no T-pulls, alarms, or fire extinguishers in the 1922 gym, pool, and locker rooms.

All egress doors are equipped with modern, panic-style bars except for the following:

1. The doors in the 1922 gym portion along with the exit doors from the corridor that connects it with the 1911 portion of the building, all have old, full-width push bars.
2. The fire doors between the 1911 portion and the corridor connecting it with the 1922 gym portion have old, full-width push bars.
3. The eyewash and shower for the science lab are working, but they are located in the adjacent storage room, and the door between the rooms is very old with a nearly inoperable doorknob

Many of the exterior doors around the entire building are blocked with removable bars that prevent them from opening without first removing the bars. These are used because the age of doors or warping or settling around the door frames prevents the doors from fully closing and locking on their own. When people exit through these doors then, it creates a security vulnerability, so the bars are normally left in place to prevent students from exiting the doors and inadvertently leaving them ajar.

The current alarm system throughout the building consists of buzzers and strobes, except that there are no alarms, detectors, or fire extinguishers in the 1922 gym portion of the building. At a minimum, an alarm system and extinguishers should be added to this part of the building. Although not required by fire code, the entire building could be brought up to modern alarm standards by installing a new alarm system that includes voice evacuation. Additionally, the fire suppression system could be extended throughout the rest of the building.

Accessibility Issues

Although efforts have been made to provide some accessible restrooms in the building, the restrooms that have been modified are still deficient from the latest ADA standards in several areas and overall there are an inadequate number of accessible restrooms in the building. There are several other accessibility and safety features throughout the building that are deficient by the latest standards such as insufficient hand and guard rails around stairs, many door knobs in parts of the building, insufficient access from accessible parking space into the building, and insufficient hand rails on an internal accessible ramp.

The second level track in the 1922 gymnasium is accessed by a steep stair with a door at the bottom. The stair does not provide compliant riser height, tread depth, handrails, and does not provide a landing on either side of the door. The track itself had a very low guardrail with only two horizontal rails. This creates a safety hazard for anyone using the track.

There are very few accessible means of egress from the building. Additional areas of refuge should be located at exit doors to allow for rescue in the event of a fire.

A summary of accessibility, life safety and fire protection deficiencies and recommendations are as follows:

1. Fire Response System Urgent Needs, including:
    a. Comprehensive replacement of exit doors and frames throughout building to resolve security and safety issues
    b. New door and hardware between silence lab and storage room
    c. New dry valve for third floor fire suppression system of original building
    d. Restore and recommission the smoke ventilation system above the stage
    e. Recommission the smoke ventilation system of the atrium
    f. Install alarms and extinguishers in 1922 gym
2. Fire Response System Upgrades, including:
    a. Extend fire suppression system into 1993 and Park Street portions of building
    b. Upgrade fire alarm system to include voice evacuation
3. Restrooms ADA Upgrades, including:
    a. Install new fixtures throughout locker rooms in 1922 gym and add accessible toilet stalls to both
    b. New accessible fixtures and signage in the restrooms in the south end of the lower level of the 1911 building
    c. New accessible fixtures and signage in the restrooms in the north end of the lower level of the 1911 building
    d. New accessible fixtures and signage in the restrooms on the second level of the 1911 building
    e. New accessible fixtures and signage in the restrooms on the third level of the 1911 building
    f. Remove one toilet and add accessible stalls and add new accessible fixtures and signage in both restrooms in the corridor of the 1993 addition
    g. Replace door hardware on restrooms of 1993 locker rooms
    h. New accessible fixtures, signage, and door hardware and remove old plumbing connections from the restrooms in the upper level of the Park Street building
4. Other Interior ADA Upgrades, including:
    a. Block access to unsafe stairs and elevated track in 1922 gym
    b. New handrails and higher guardrails on all stairwells in the 1911 building
    c. New handrails on accessible ramp in 1993 addition
    d. Replace all door knobs throughout the Park Street building with accessible door hardware
5. Exterior ADA Upgrades, including:
    a. Improve marking and signage of accessible parking space and re-pave path to accessible entrance
    b. Replace accessible ramp and rails to main entrance of 1911 building
    c. New accessible ramp for Park Street upper-level entrance

Hazardous Materials

ACM can be found (or is suspected) in many instances throughout the 1911, 1922, and 1964 portions of the Middle School, specifically in the following items and locations:

1. The corrugated pipe insulation on the old low-pressure steam piping throughout the 1911 and 1922 portions of the building
2. The debris and contaminated soil in the crawlspaces beneath the 1911 and 1922 portions of the building
3. The cement board in the fume hood in room 219
4. The white, woven electrical wiring insulation on the stored stage lights in the prop room of the auditorium
5. The acoustical plaster on the ceilings and walls throughout much of the Park Street portion of the building
6. The 12-inch by 12-inch floor tiles in the restrooms of the Park Street portion of the building
7. The 9-inch by 9-inch floor tiles throughout much of the Park Street portion of the building, where it is exposed in some cases and under carpet in others
8. The reflector paper in the light fixtures of the North entryway, restrooms, and principal's room of the Park Street portion of the building
9. The gypsum wallboard of the walls and ceilings throughout much of the 1964 addition of the building
10. The cement panels on the exterior, above the windows, on the east side of the Park Street portion of the building

Security and Access Control

The main building entrance in the 1911 portion of the building utilizes a secure entry which is controlled from the reception desk in the office that is across the corridor from the entry door. Once an entrant is admitted, they are immediately in one of the main corridors of the building.

There are adequate interior security cameras to provide coverage of all interior corridors, but there are insufficient external security cameras to provide views of all possible entry points into the building. Additionally, the security camera system was reportedly designed for small building applications and is inadequate to meet the needs of a school building and it is not on a dedicated computer system that would allow continuous live monitoring. The live feed from the cameras can be checked on one of the school administrator's computers and the there is a DVR system that records a certain number of hours of footage that can be reviewed later.

Security and Access Control deficiencies and recommendations are summarized below:

- Upgrade the security camera system to allow for continuous live monitoring
- Increase the number of external cameras to provide more thorough coverage of the building's exterior

Trinidad High School

General Building Information

Trinidad High School was constructed in 1972 and consists of three stand-alone buildings. The A building is 55,364 square feet and contains the classrooms, library, cafeteria, kitchen, and administrative offices. The B building is 23,930 square feet and contains the wood shop, art classrooms, machine shop, band room, and pre-kindergarten classroom. The C building is the High School gym and is 43,120 square feet. All three buildings are located near one another as shown on the map to the right.

Building Structure

The cantilevered sidewalk on the east side of the upper level of Building B is in very poor condition. It is likely catching precipitation and allowing moisture to pass through it, creating water damage to the underside of this structure and the adjacent wall of the building. This could be due to the failure of the concrete sidewalk but is also likely due to inadequate or improper drainage design in the initial construction. The condition of this structure is so poor that it was deemed unsafe and access to it has been blocked by chain-link gates on both ends. This structure should either be demolished if feasible or repaired and a proper drainage system installed.

Recommendation: Repair or demolish the cantilevered sidewalk on the east side of the upper level of Building B.

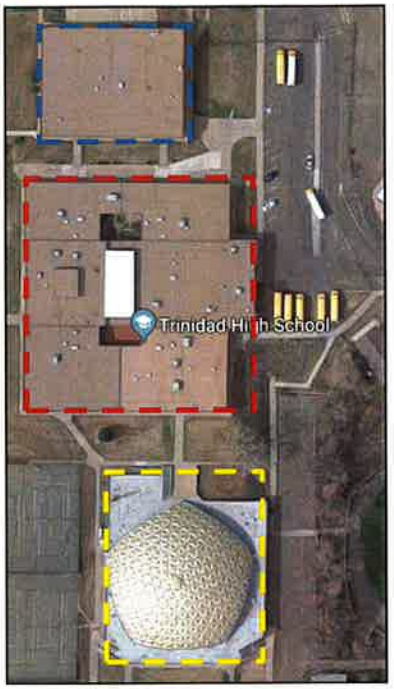
Building Envelope

The A building has a ballasted built-up roof that is in fair condition. The membrane appeared to be in adequate condition and the maintenance staff did not report any persistent leaks.

The B building also has a ballasted built-up roof. Unfortunately, the assessment team was not able to access the roof and directly observe the condition of the membrane. According to the maintenance staff, the roof is also in fair condition and will be due for replacement soon.

The C building has a unique, geodesic dome structure. The roof is composed of dozens of triangular aluminum panels that are bolted together to form the dome. Unfortunately, the metal panels expand and contract with changes in temperature which results in gaps developing in the panel joints. The district routinely re-caulks the joints, but invariable new leaks develop every year. This is an inescapable result of the roof design and there is likely no permeant solution. If possible, this entire roof needs to be resealed through a comprehensive effort of removing all the old joint seals (many layers of silicon calk built up over time) and replacing them, possibly with a custom-made solution for this type of roofing system. However, it is likely that the most economical path forward is simply to budget time and money to re-caulk the joints every year. The roof of this building over the locker rooms, weight room, and wrestling room, continues to suffer frequent failures and may need to be evaluated for the installation of a new, longer-term solution such as installing a new type of roofing system that provides better drainage and performance and blocking off the

A Building
B Building
C Building (Gym)



The High School campus consists of three stand-alone buildings located a short distance apart.

The ballasted built-up roof atop the High School A building is in adequate condition. The roof atop the High School B building is in poor condition and due for replacement.

The dome is composed of aluminum panels which expand and contract throughout the year. Consequently, cracks form in the caulking between panel joints and leaks develop every year.

The ballasted built up roof atop the High School A building is in adequate condition. The roof atop the High School B building is in poor condition and due for replacement.

The B building is conditioned by hot water cabinet heaters. The boiler serving the hot water loop is in poor condition and is at the end of its reliable lifespan. The building has no cooling and poor ventilation

The outside air intakes of the heaters in the B building have been blocked off. This is likely because the system us undersized and cannot effectively heat the spaces with outside air.

The High School A building is conditioned by packaged gas/dx rooftop units. The units were installed in 2012 and are in good condition.

pedestrian access to these portions of the roof. Since this part of the building's roofing system was recently replaced and is still in serviceable condition, it is not recommended to make any of these changes at this time.

Electrical and Distribution Systems

The main distribution panel in the A building was upgraded in 2012 along with a HVAC renovation. It is in good condition and was sized appropriately for the school.

The main distribution panel in the B building is in poor condition. Its main breaker is rusted and has locked open. In the event of an electrical emergency in the B building, the maintenance staff would need to shut off power to all three buildings. This main shut-off switch is located off premises. This is a serious code violation and safety risk.

The main distribution panel in the gym is still working, but is past the end of its reliable life.

Electrical System deficiencies and recommendations are summarized below:

- The main distribution panel in the B building has a dysfunctional shut off switch and needs to be replaced.
- The main distribution panel in the gym is past the end of its reliable life and needs to be replaced.

Mechanical HVAC Systems

The B building is conditioned by hot water cabinet heaters located in each room. The heaters were observed to be in poor condition. The rooms are not receiving any ventilation air because the outside air intakes of the heaters have been blocked off. Proper ventilation air is crucial for maintaining a healthy indoor environment, so mitigating this issue is a pressing need. A low efficiency atmospheric gas boiler heats the hot water loop and is also in poor condition. It is over 20 years old and has exceeded its ASHRAE recommended lifespan. The building needs a comprehensive HVAC renovation that replaces the deteriorated equipment, ensures each space receives proper ventilation air, and is energy efficient. The dust collection system in the wood shop of Building B is original and has serious and increasing maintenance problems. Although it is currently operable, it cannot be relied on to continue working for much longer.

The A building is conditioned by packaged gas/DX rooftop units that were installed in 2012. On average, each unit serves 2-3 classrooms. This arrangement is not ideal for occupant comfort as conflicts can arise between the different rooms. Though, the maintenance staff did not report that conflicts were occurring. The units are relatively new and are still in good condition. Each unit is controlled by an individual thermostat with scheduling capability. Unfortunately, the thermostats cannot be scheduled remotely which makes it difficult for the short-staffed maintenance to ensure the units are always operating efficiently. The exhaust fan in the vent hood in the science lab is not working, and no exhaust in the chemical storage areas of the science lab were observed.

The C building (gymnasium) is conditioned by a combination of hot water air handlers, hot water cabinet heaters, and hot water unit heaters. The large stadium has a very high domed ceiling. To heat this large volume of space, there are three large hot water air handlers located along the stadium perimeter. During most of the year only one air handler needs to be running to adequately heat the space. Unfortunately, a large percentage of the hot air leaving the air handlers likely is floating to the top of the dome without efficiently conditioning the space. Consequently, the air handlers must push out more hot air than is necessary.

Large hot water air handlers located around the stadium perimeter heat the facility. There is no cooling in the building.

The district placed destratification fans in the room to mitigate this issue, but the maintenance staff no longer uses the fans because they routinely broke down and repairing them was too difficult due to their height and inaccessibility. The district should explore higher quality de-stratification fans that are more reliable. There is no cooling in the facility which makes the building uncomfortable during the spring and fall. There are large fans located around the building perimeter that can pull outside air into the building to provide some marginal cooling and ventilation, but this ad hoc solution is ineffective on very hot days.

The exhaust fans for the gymnasium locker rooms and wrestling room are not working and there is currently no provision for these spaces to receive consistent ventilation air. Due to the high humidity that can arise in these spaces, this is a serious safety risk. Without adequate ventilation, dangerous strains of mold and bacteria can easily grow in these spaces. Two extremely large atmospheric boilers supply hot water to the building. Each boiler can provide 8,869 MBH of heat which is excessive for a building of only 43,000 square feet. These boilers should be replaced by a smaller, more efficient hot water plant. Additionally, the boilers are 40 years old and replacement parts are impossible to find. They have reached the end of their reliable lifespan.

The gymnasium lockers rooms do not have a functional ventilation and exhaust system. Due to the high moisture content in these rooms, dangerous mold and bacteria strains can grow without proper ventilation

The large hot water boilers serving the building are 40 years old and are extremely inefficient. They need to be replaced with a smaller, more efficient boiler plant that is easier to maintain.

Mechanical HVAC System deficiencies and recommendations are summarized below:

- The High School B building needs a comprehensive HVAC renovation. The simplest solution will likely be packaged gas/DX rooftop units similar to the system at the High School A building. These units will ensure the rooms receive appropriate ventilation.
- The dust collection system of the wood shop needs to be replaced with a more modern and reliable system.
- The exhaust fan in the laboratory vent hood needs to be repaired and the exhaust system of this room needs to be expanded to include continuous exhaust for the chemical storage areas.
- The High School C building (Gymnasium) needs a new ventilation and exhaust system to serve the lockers rooms and wrestling rooms. Maintaining proper air quality is an imperative in these spaces.
- The High School C building needs a new, more efficient hot water plant. The existing plant is grossly oversized, inefficient, and outdated.

Plumbing

There is no pressure regulating valve and backflow preventer in the domestic water line entering the facility. This is violation of local building codes and needs to be mitigated. Unfortunately, the domestic water line is in the basement mechanical room ceiling, so installing a new PRV and backflow assembly will require some new pipework. The showers in the boy's locker room in the C building are not operable because a history of frequently broken and leaking fixtures has led the maintenance staff to keep the water to them turned off. All plumbing fixtures throughout the building are standard-flow with long flush rates.

Plumbing System deficiencies and recommendations are summarized below:

- Install the code required PRV and backflow assembly in the domestic water piping.
- Replace the shower fixtures in the boy's locker room of the C building with a different type of fixture that is more durable.
- Upgrade all plumbing fixtures to low-flow, high-efficiency fixtures

Interiors

Most of the interior finishes throughout the three High School buildings appear to be in good condition, however, there are couple of areas of concern: All but one of the four sets of bleachers in the C Building are old and reportedly unsafe. The condition and operability of the science lab in the A building is very poor, with many of the fixtures and furniture not working.

Interior deficiencies and recommendations are summarized below:

- Replace the three older sets of bleachers with safer and more modern equipment.
- Renovate or relocate the science lab.

ADA Accessibility, Life Safety and Fire Protection

Fire Response System Issues

All egress doors throughout the three buildings have modern, panic bars except for the following:

1. The two sets of double exit doors in the lower level of the B building, which both still have old, full-width push bars
2. Both sets of fire doors from the cafeteria into the corridor in the A building, which both have old, full-width push bars

One of the old-style double doors in the lower level of the B building has an arresting bar around the center pole to prevent the doors from being operated. This is the same as many doors with similar items throughout the middle school, reportedly because these doors suffer from thermal expansion and sometimes fail to close fully, creating security vulnerabilities.

There is no plumbed eyewash station and shower in the science lab, only a wall-mounted eyewash kit and a fire-retardant blanket mounted near the door.

Throughout the High School buildings, the only fire alarms are the older style that do not have strobe lights. Only the C building has a fire suppression system. Although not required by fire code, all the building can be brought up to modern standards in these areas by installing a new alarm system that includes strobe lights and voice evacuation and the current fire suppression system can be extended into the other two High School buildings.

Accessibility Issues

Although efforts have been made to provide some accessible restrooms in the three buildings, the restrooms that have been modified are still deficient from the latest ADA standards in several areas and overall there are an inadequate number of accessible restrooms in the buildings. There are several other accessibility and safety features throughout the buildings that are deficient by the latest standards such as inadequate accessibility into the gym and B building, insufficient hand rails on ramps and stairs, and an unsafe roof deck of the gym that is accessible to pedestrian traffic.

A summary of accessibility, life safety and fire protection deficiencies and recommendations are as follows:

1. Fire Response System Urgent Needs, including:
    a. New door hardware for two sets of egress doors in the B building and two sets in the A building
2. Fire Response System Upgrades, including:
    a. Upgrade fire alarms to voice evacuation
    b. Extend fire suppression system into A and B buildings
3. Restrooms ADA Upgrades, including:
    a. New accessible fixtures, partitions, and signage in the restrooms in the lower level of B building
    b. Renovate two storage rooms into accessible unisex restrooms in the upper level of B building
    c. Comprehensive renovation of the daycare restroom in B building
    d. Where previously altered for accessibility, provide new fixtures, accessories, and signage in restrooms in the A building
    e. Install one unisex accessible restroom at each restroom cluster (except where existing restrooms where already altered)
    f. Comprehensive renovation of small restroom next to kitchen of A building to make it accessible
    g. Remove one toilet and add accessible stall and other fixtures and signage in all three locker rooms of the C building
    h. Renovate showers of all three locker rooms of the C building to allow accessible use
4. Other Interior ADA Upgrades, including:
    a. Replace hand rails on all interior ramps of the A building
    b. Replace hand rails on all interior stairs of A building
    c. Replace hand and guard rails on all internal stairs of C building
5. Exterior ADA Upgrades, including:
    a. Install new accessible ramp to lower level of the B building
    b. Install new accessible ramp to upper level of the B building
    c. Install new accessible ramp between the A and C buildings
    d. Replace hand and guard rails on all external stairs between the three buildings
    e. Replace hand rails on all exterior staircases of C building
    f. Install guard rail around entire roof deck of C building
    g. Replace damaged concrete walkway to accessible entrance of C building

Hazardous Materials

There are many instances of ACM (known and suspected) in all three of the High School buildings, specifically in the following items and locations:

1. The insulation of the domestic hot water tank located in the fan room south of the kitchen in the A building
2. The metal fire doors of the fan room south of the kitchen in the A building
3. The 12-inch by 12-inch floor tiles throughout most of the A building
4. The paper tape in in the fan room south of the kitchen in the A building
5. The mudded joint packings of the pipe insulation system for the heating water system in the south kitchen HVAC room in the A building
6. The 12-inch by 12-inch floor tiles throughout much of the B building
7. The wood fire doors throughout the B building
8. The flue insulation in the mechanical room of the B building
9. The mudded joint packings of the pipe insulation system for the boiler in the mechanical room of the B building
10. The cement panels at the exterior door into the band room in the lower level of the B building
11. The vibration joint cloth in the shops of the B building
12. The metal fire doors of the mechanical room of the C building
13. The flue insulation in the mechanical room of the C building
14. The insulation on the domestic hot water tank in the mechanical room of the C building
15. The vibration joint cloth on equipment throughout the C building, such as on the exhaust of the emergency generator in the mechanical room, in the laundry room, and on the air handlers
16. The molded gaskets on the doors of the mechanical room in the C building

Security and Access Control

The High School visitor entrance is in the A building and utilizes a secure entry which is controlled from the reception desk in the office that is around a corner in the corridor from the entry door. Once an entrant is admitted through the door, they are immediately in one of the main corridors of the school. There are adequate interior security cameras to provide coverage of all interior corridors, but there are insufficient external security cameras to provide views of all possible entry points into the building.

Additionally, the security camera system was reportedly designed for small building applications and is inadequate to meet the needs of a school building and it is not on a dedicated computer system that would allow continuous live monitoring. The live feed from the cameras can be checked on one of the school administrator's computers and the there is a DVR system that records a certain number of hours of footage that can be reviewed later.

Security and Access Control deficiencies and recommendations are summarized below:

- Upgrade the security camera system to allow for continuous live monitoring
- Increase the number of external cameras to provide more thorough coverage of the building's exterior

Eckhart Elementary School

General Building Information

Eckhart Elementary serves kindergarten and first grade. It consists of two building wings. The older wing was constructed in 1964 and contains most of the classrooms, the cafeteria, the kitchen, and the administrative offices. The newer wing was constructed in 2002 and contains additional classrooms and a small gymnasium. There are two old modular classroom buildings made of wood-frame construction with wood siding located just to the north of the school that are used for additional storage. There are also two external freezers at the northwest corner of the building because of inadequate food storage space in the kitchen.

Eckhart Elementary School

Building Program & Function

Approximately 20% of the classrooms in the building are used for storage rather than instruction. As discussed in the space utilization section, the district would like to strategically address the underutilization. No other programming or space changes are recommended at this time.

Exterior Modular Buildings

Building Structure

The building's foundation and superstructure appear to be in good condition and are expected to be serviceable for many years to come. The old modular classroom buildings that are currently used for storage are not connected to any utilities, are in very poor condition, and need to be demolished.

Significant settling of the sidewalks around the northwest corner of the building has created ponding issues in front of the external freezers which makes access to these freezers dangerous any time there is precipitation of freezing. The sidewalk that runs along the north-facing external wall of the northwest corner of the building is separating away from the wall creating a significant gap that is likely allowing water to affect the foundation under this portion of wall. This gap should be filled and the sidewalks re-poured with correct slopes to help shed water away from the building.

Exterior settling and cracking

Structural deficiencies and recommendations are summarized below:

- The two, old modular classroom buildings need to be demolished.
- The sidewalks around the northwest corner of the building need to be re-poured to properly shed water away from the building.


1964 Building Exterior


The 1964 wing has aluminum framed windows that are in serviceable condition.


The 1964 wing has carpet floors, cmu block walls, and acoustic tile ceilings.


The new main distribution panel installed in 2002. It is in excellent condition and is providing the building with sufficient electrical capacity.

Building Envelope

Both the 1964 and 2002 wings have brick facades that are in good condition. The roof atop the 1964 portion was replaced within the last few years and is in excellent condition. The roof atop the 2002 wing is original making it 15 years old. Although it is nearing the end of its 20-year life expectancy and is still in serviceable condition plans should be made now to replace the roof within the next 5-10 years. The windows across the entire facility have dual panes and aluminum frames. They were observed to be in serviceable condition, so replacement is not a priority.

Plumbing

Plumbing systems throughout the building are generally in good condition, although the water pressure at this building was reported to be very low. All plumbing fixtures throughout the building are standard-flow with long flush rates.

Recommendation: Upgrade all plumbing fixtures to low-flow, high-efficiency fixtures.

Interiors

Most of the interior finishes appear to be in good condition, however there is water damage on one of the interior walls of the atrium that joins the two wings of the building. The source of this water infiltration has not yet been determined, but it is probably due to some failed or improperly installed flashing or roof drainage equipment. It needs to be identified and corrected before the water damage worsens.

Recommendation: Identify and fix the source of the water infiltration problem in the atrium and repair the water-damaged wall.

Electrical and Distribution Systems

At the time of the 2002 renovation a new main distribution panel was installed to serve the school. This MDP provides adequate capacity for both the 2002 and 1964 wings. The original 1964 classrooms have a shortage of room outlets, a common problem in old buildings. Though, kindergarten and first graders do not have the dramatic electrical needs of older students, so addressing this issue is not a priority.

Recommendation: Due to the energy and utility savings potential, the existing fluorescent lighting systems is recommended to be replaced with more efficient LED systems.

Mechanical HVAC Systems

The school has a variety of HVAC systems. The 2002 gymnasium is conditioned by a rooftop furnace that is in poor condition. At 15 years old, it is at the end of its ASHRAE recommended lifespan and needs to be replaced. The gym does not have any cooling and can get very uncomfortable during the fall and spring.

The 2002 classrooms are conditioned by a VAV system that utilizes a gas/DX rooftop unit to provide supply air to the building. The VAV terminal units appear to have electric reheat, which is extremely inefficient. The rooftop unit is at the end of its ASHRAE recommended lifespan, but is still operating effectively. Still, it would be wise to proactively budget money to replace the unit.

The 1964 classrooms are conditioned by packaged gas/DX rooftop units installed in 2010. These units are seven years old and are still in good condition. Each rooftop unit serves two classrooms. Normally, this would result in persistent comfort conflicts between occupants, but the building is so underutilized that most teachers have their own thermostats. The outside air dampers in the rooftop units sometimes get stuck open, which dumps cold air onto the occupants in the winter. The maintenance staff do not have trouble fixing this problem when it occurs. Otherwise, the units are operating effectively.

The cafeteria, administrative offices, and bathrooms in the 1964 wing are served by a hot water loop original to the wing's construction. The atmospheric cast iron hot water boiler is over 25 years old and is at the end of its reliable life. The boiler is likely producing hot water at an efficiency of 65% which is poor. Due to the poor condition of the boiler and the minimal extent of the hot water loop, the entire system should be replaced. Packaged equipment should be installed in place of the hot water heating system to condition the cafeteria, offices, and bathrooms. This solution will also provide needed cooling and fresh ventilation air in these spaces. Packaged equipment for this portion of the building will also create a consistent HVAC system across the building and will ensure that the cafeteria receives adequate ventilation.

The exhaust fan in the boy's restroom near the corner of the building where the 1964 wing meets with the connecting-atrium is very loud and likely needs to be repaired or replaced.

The HVAC system in the 2002 wing has a JCI building control system, but the maintenance staff is unable to actually utilize it. Consequently, the maintenance team cannot schedule equipment on and off, significantly reducing the efficiency of the system. The new rooftop units conditioning the 1964 wing are controlled by individual thermostats. The maintenance staff cannot monitor the thermostats or set schedules remotely.

The boiler serving the hot water loop in the 1964 wing is over 25 years old. It is at the end of its recommended lifespan.

The rooftop furnace serving the gymnasium is at the end of its reliable lifespan and is due for replacement. (2002)

Water heater in storage tank (1974 addition)

Mechanical HVAC System deficiencies and recommendations are summarized below:

- The rooftop furnace serving the gym should be replaced with a new, high efficiency unit that can also provide cooling to the space.
- The hot water boiler is at the end of its reliable life and needs to be retired. Additionally, the cafeteria lacks ventilation. New high efficiency packaged equipment should be installed to serve the cafeteria, offices, and bathrooms. These units will provide proper ventilation to the offices and cafeteria.
- Repair or replace the exhaust fan in the boy's restroom in the 1964 wing of the building.
- A modern, web accessible building management system needs to be installed to ensure the equipment in the facility is providing proper ventilation air and operating efficiently.

ADA Accessibility, Life Safety and Fire Protection

Fire Response System Issues

The roof access ladder in the janitorial closet in the corridor of the 2002 addition is open to the space that is enclosed by the drop-ceiling. This opening should to be enclosed by an appropriate fire-rated wall.

The building does not have a fire suppression system. The current alarm system throughout the building consists of buzzers and strobes. Although not required by fire code, the building can be brought up to modern standards in these areas by installing a new alarm system that includes voice evacuation and a fire suppression system can be added to the building.

Accessibility Issues

Although efforts have been made to provide some accessible restrooms in the building, the restrooms that have been modified are still deficient from the latest ADA standards in several areas. There are several other accessibility and safety features throughout the building that are deficient by the latest standards such as doors with insufficient push clearances, no accessible drinking fountains, inadequate accessibility in parking and entrance path, and an inaccessible playground that does not meet modern fall-protection standards.

A summary of accessibility, life safety and fire protection deficiencies and recommendations are as follows:

1. Fire Response System urgent needs, including:
    a. Enclosing roof-access ladder space with fire-rated walls
2. Fire Response System optional upgrades, including:
    a. Upgrade fire alarm system to voice evacuation
    b. Install a fire suppression system in the building
3. Restrooms ADA Upgrades, including:
    a. Add vertical grab bars in the accessible stalls of the restrooms in the new wing
    b. Eliminate the small access hallway at the corner of the building and make the restrooms there into fully compliant accessible restrooms
    c. Expand the restroom in CR115 into the adjacent closet and make it fully accessible
    d. Lower the sinks in the large bathrooms in the original building and remove wooden platforms

4. Other Interior ADA Upgrades, including:
    a. Replace frames and doors in interior classroom doors in the original building so they swing into corridor and provide adequate push clearance
    b. Install two accessible drinking fountains
5. Exterior ADA Upgrades, including:
    a. Replace playground surface with engineered wood fiber and install an accessible ramp
    b. Improve marking and signage of accessible parking space and add an accessible path of compacted crusher fines to paved sidewalk

Hazardous Materials

Asbestos-containing materials (ACM) can be found in the flooring and walls throughout the original portion of Eckhart Elementary school. Specifically, in the following items and locations:

1. The 9-inch by 9-inch tile floors which are exposed in several storage rooms, restrooms, closets, and in the cafeteria, and that are beneath the carpeting throughout most of the rest of the original building.
2. The Gypsum wallboard on the upper walls throughout the original building.

Security and Access Control

The main building entrance in the 2002 addition utilizes a secure entry which is controlled from the reception desk in the atrium that is across the corridor from the entry door. There are adequate interior security cameras to provide coverage of all interior corridors, but there are insufficient external security cameras to provide views of all possible entry points into the building. Additionally, the security camera system was reportedly designed for small building applications and is inadequate to meet the needs of a school building and it is not on a dedicated computer system that would allow continuous live monitoring. The live feed from the cameras can be checked on one of the school administrator's computers and the there is a DVR system that records a certain number of hours of footage that can be reviewed later.

Security and Access Control deficiencies and recommendations are summarized below:

- Upgrade the security camera system to allow for continuous live monitoring
- Increase the number of external cameras to provide more thorough coverage of the building's exterior

Fisher's Peak Elementary School

General Building Information

Fisher's Peak Elementary was constructed in 2002 and is the newest building in the district. It serves grades one through five. The school contains classrooms, a gymnasium, a cafeteria, a library, and a kitchen.

2002 Fisher's Peak Elementary exterior

Building Structure

The load bearing walls throughout the building are supported by cast-in-place concrete stem wall footings. The interior walls and floors are supported by a slab on grade. Unfortunately, the ground underneath the slab was not backfilled correctly. Consequently, the slab has undergone excessive settling and upheaval since the school's construction and cracks are widespread. There is related damage throughout the building interior. CMU blocks are cracking and falling out of interior walls, there are noticeable cracks under the classroom carpets up to one-inch wide, shattered slabs under the vinyl tile in the cafeteria along with probable water infiltration through the cracks is causing deterioration and failure of the tile adhesive. Slab upheaval next to door thresholds at some transitions is so severe that the bottom of doors had to be trimmed for the door to still operate.

The settling of the concrete slab has damaged many of the interior walls in the school.

Spaces are developing under interior partition walls built from wood studs. Unfortunately, the only way to permanently fix the problem would be a replacement of the slab, which is cost prohibitive. A study shortly after the building was constructed determined that settling and upheaval issues are only initial and they are not ongoing. Additionally, the concrete stem wall footings are in good condition and the structural bones of the building are secure.

The settling slab has also produced a wide array of cracks in the floor.

No structural improvements are recommended.

Building Envelope

The exterior of the building is composed of a brick façade that is in good condition. The ballasted built-up roof is original to the 2002 construction and is in serviceable condition. The walls and steel beams that constitute the atrium in the library showed excessive corrosion due to water infiltration that appears to be from ponding on the small roof of the atrium that has no gutters or downspouts. Correctly sloping this roof and adding a single downspout may resolve this problem.

The building is protected by a ballasted built-up roof that is in fair condition. It is original to the 2002 construction.

The windows throughout the school have dual pane glazing and aluminum frames. They were observed to generally be in good condition.

Recommendation: Re-roof and provide proper drainage of the roof over the library atrium.

Electrical and Distribution Systems

The electrical distribution in the building is in good condition. The MDP was sized properly and the classrooms have an appropriate number of outlets.

The electrical system is relatively modern and is still in excellent condition. The main distribution panel has adequate capacity and the classrooms have enough outlets to serve the needs of the students.

Recommendation: Due to the energy and utility savings potential, the existing fluorescent lighting systems is recommended to be replaced with more efficient LED systems.

Mechanical HVAC Systems

The classrooms are conditioned by packaged DX VAV air handlers located on the roof. Each room has a dedicated terminal VAV box with electric reheat.

The gym is conditioned by a natural gas fired air handler located in the mechanical mezzanine. The unit only provides heat and is in good condition. The stage is conditioned by a gas/DX rooftop unit that is in fair condition. At 15 years old it is at the end of its ASHRAE recommended lifespan, but is still in serviceable condition. The library is conditioned by a gas/DX air handler located in the mechanical mezzanine and a gas/DX rooftop unit. The indoor air handler is in good condition and the rooftop unit is in fair condition.

The classrooms and offices throughout the school are conditioned by VAV terminal boxes with electric reheat. Four Gas/DX rooftop air handlers supply air to the terminal boxes. The air handlers are at the end of their ASHRAE recommended reliable life and are due for replacement. This system is adequately maintaining occupant comfort, but it is extremely inefficient. Due to the relatively high electric rates in the city, it is very expensive to heat with electricity. Each of the VAV boxes is utilizing an electric reheat coil. Unfortunately, converting the system to hot water reheat would not be economical.

The HVAC equipment can be scheduled and monitored with an outdated command line control system. The system is difficult to navigate and is only accessible onsite. There is no way for the maintenance team to monitor the HVAC equipment remotely. The building needs a modern building management system.

Mechanical HVAC System deficiencies and recommendations are summarized below:

- The indoor air handler serving the gym should be retrofitted with cooling so that the gym can be utilized during the summer.
- The gas/DX rooftop air handlers serving the VAV terminal boxes are at the end of their lifespans and need to be replaced.
- A modern, web accessible building management system needs to be installed to ensure the equipment in the facility is providing proper ventilation air and operating efficiently.

Plumbing

Plumbing systems throughout the building are generally in good condition. All plumbing fixtures throughout the building are standard-flow with long flush rates.

Recommendation: Upgrade all plumbing fixtures to low-flow, high-efficiency fixtures.

Interiors

Minor damage to the interior walls and flooring of this building is widespread throughout it because of the settling and upheaval of the concrete slabs. Extensive cracking of the internal CMU walls is mainly a cosmetic concern, but in some places complete bricks have become loose, which could create a safety problem. The vinyl tile floor of the cafeteria has extensive cracking and shows signs of possible water damage under the tiles. Again, this is mainly a cosmetic concern, but if left uncorrected, the condition of this floor could worsen and failed tiles could create slip or trip hazards. The water damage on the interior walls and beams of the library atrium is also a minor, cosmetic issue but these surfaces can be easily cleaned and restored after the water infiltration problem is corrected.

Interior deficiencies and recommendations are summarized below:

- Tuckpoint cracked mortar on internal CMU walls throughout the building
- Determine if water infiltration or further settling/upheaval of the slabs under the cafeteria are causing the continued cracking and failure of the vinyl tiles, remediate appropriately if possible and feasible (such as sealing cracks against further moisture), and install a more resilient and appropriate flooring system
- Repair water damaged walls and beams by cleaning, sealing infiltration points, and repainting

ADA Accessibility, Life Safety and Fire Protection

Fire Response System Issues

The current alarm system throughout the building consists of buzzers and strobes. Although not required by fire code, the building can be brought up to modern standards in this area by installing a new alarm system that includes voice evacuation.

Accessibility Issues

Given the recent construction of this school, the restrooms are generally accessible, however, they lack the latest addition to ADA standards of a vertical grab bar in accessible stalls. There are a couple of other accessibility and safety features at this building that are deficient by the latest standards such as insufficient hand rails along the accessible ramp in the corridor and an inaccessible playground that does not meet modern fall-protection standards.

A summary of accessibility, life safety and fire protection deficiencies and recommendations are as follows:

1. Fire Response System optional upgrades, including:
    a. Upgrade fire alarm system to voice evacuation
2. Restrooms ADA Upgrades, including:
    a. Add vertical grab bars in the accessible stalls of the restrooms
3. Other Interior ADA Upgrades, including:
    a. Replace hand rails along accessible ramp in corridor
4. Exterior ADA Upgrades, including:
    a. Replace playground surface with engineered wood fiber and install an accessible ramp

Hazardous Materials

The facility was recently constructed and does contain any hazardous materials. No abatement projects are needed.

Security and Access Control

The main building entrance utilizes a secure entry which is controlled from the front office. Once an entrant is admitted through the entry door, they are immediately in a lobby at the intersection of the main corridors of the building. There are adequate interior security cameras to provide coverage of all interior corridors, but there are insufficient external security cameras to provide views of all possible entry points into the building.

Additionally, the security camera system was reportedly designed for small building applications and is inadequate to meet the needs of a school building and it is not on a dedicated computer system that would allow continuous live monitoring. The live feed from the cameras can be checked on one of the school administrator's computers and the there is a DVR system that should record a certain number of hours of footage that can be reviewed later, however the DVR system in this building is not currently working.

Security and Access Control deficiencies and recommendations are summarized below:

- Upgrade the security camera system to allow for continuous live monitoring
- Increase the number of external cameras to provide more thorough coverage of the building's exterior
- Repair or replace the DVR system

Summary of Recommendations & Cost Estimates

The following tables summarize cost estimates for each improvement needed for each building described in the previous section. Narrowed down recommendations that reflect addressing more immanent needs are highlighted and further detailed in the Strategic Plan for Implementation section of this Master Plan.

Trinidad Middle School

Component	Recommendation	Priority Tier	Cost Estimate [1]	Comments
Building Structure	Remediate Below Grade Walls 1911/1922 Construction	Tier I	$1,315,258	Further structural analysis in development
Building Envelope	Tuckpoint Entire 1911 Building	Tier I	$608,678	-
	Comprehensive Window Replacement	Tier I	$833,216	-
	Improve Drainage off Auditorium	Tier I	$7,780	-
Interiors	Replace Failing Floor Tiles in 1911 Building - Repair Subfloor as Needed	Tier I	$301,349	-
	Remediate Water Damaged Ceiling Joists in Auditorium - Replace Water Damaged Lights and Ceiling Tile	Tier II	$32,773	-
Electrical	Replace Generator & Add Servers to Back-up Circuit	Tier I	$153,746	-
	Add Additional Outlets in Classrooms	Tier I	$35,789	-
	Building Wide LED Retrofits	Tier II	$352,729	-
	Replace Electrical System in 1964 Park St Addition	Tier I	$230,958	-
HVAC	Classroom Air Source VRF w/ DOAS & Controls	Tier I	$5,854,149	-
	High Efficiency Auditorium Rooftop Units w/ Cooling	Tier I	$134,713	-
	High Efficiency Gym Rooftop Unit w/ Cooling	Tier I	$116,453	-
	High Efficiency Cafeteria Rooftop Unit w/ Cooling	Tier I	$98,193	-
	Fix Bathroom/Lab/Janitor Closet Ventilation Fans	Tier I	$4,282	-
Plumbing	Upgrade fixtures throughout building	Tier II	$64,372	-
ADA Life Safety Fire Protection	Comprehensive Replacement of Exit Doors	Tier I	$132,930	-
	Dedicated bathroom for Nurse's Office	Tier II	$52,223	-
	ADA compliant sidewalks outside 1922 gym	Tier II	$22,041	-
	ADA Compliance & Modern Safety Standards	Tier I	$25,145	Railings around stairwells, code compliant door hardware in Park St, etc.
	ADA Compliant Bathrooms Building Wide	Tier I	$339,331	-
	ADA Access Ramp for Park St. Basement Rooms	Tier II	$9,616	-
	Fire Suppression System for Park St. Building	Tier I	$739,685	-
	Upgrade 1911 Fire Suppression System	Tier I	$758,283	Extend fire alarm system to 1922 gym and upgrade system to include voice evacuation

	Correct Deficiencies in 1911 Fire Suppression System	Tier I	$109,896	Repair exhaust system in auditorium, and fix dry valve in the attic.
Hazardous Materials	Remediate Asbestos as Needed for New Work	Tier I	$TBD	-
Security & Access Control	Implement Continuous Live Monitoring Camera System. Expand Exterior Coverage	Tier II	$55,610	-
	Secure Entry Vestibule for Main Entrance	Tier I	$368,943	-
		Total:	$12,758,141	

Notes: [1] Costs estimates include soft costs such as architectural, engineering and general contracting fees.
[2] Refer to HVAC system alternatives life cycle cost analysis in XIV. Strategic Plan for Implementation

Trinidad High School

Component	Recommendation	Priority Tier	Cost Estimate [1]	Comments
Building Structure	Repair & Correct Drainage or Remove Suspended Sidewalk on East Side of B Building	Tier I	$49,486	-
Building Envelope	Replace B Building Roof	Tier I	$635,072	-
Interiors	Renovate the Chemistry Lab to Meet Educational Intent	Tier I	$TBD	Further collaboration needed with district to generate estimate
Electrical	Expand Electrical Panel Capacity	Tier I	$15,287	-
	Replace B Building MDP Panel	Tier I	$40,411	-
	LED Lighting Retrofit	Tier II	$114,807	-
HVAC	Modern Building Management System for A & B Buildings	Tier I	$186,365	-
	Install Packaged Rooftop Units to Serve B Building Classrooms - Decommission Boiler.	Tier II	$1,011,871	-
	Install Packaged Rooftop Units to Serve B Building Classrooms - Decommission Boiler.	Tier II	$1,011,871	-
	Improve Dust Collection System in the Woodshop	Tier I	$29,691	-
	Repair and Expand Exhaust Hood System for Lab	Tier I	$42,608	-
	Install Smaller, Efficient Boilers in the Gym	Tier I	$794,102	-
	Modern Building Management System in the Gym	Tier I	$101,345	-
	Install Locker Room Ventilation System in the Gym	Tier I	$135,528	-
Plumbing	Install Backflow Preventer	Tier I	$54,434	-
	Renovate Showers in Gym Locker Rooms	Tier I	$67,632	-
	Upgrade Fixtures Throughout Building	Tier I	$27,359	-
ADA Life Safety Fire Protection	Exterior ADA Upgrades at the A & B Buildings	Tier II	$183,869	New ramps to the B building upper and lower levels. New ramp between A building and the gym. Code compliant handrails around stairs.
	ADA Compliant Bathrooms at the A & B Buildings	Tier I	$292,479	
	Fire Response System Upgrades in the A & B Buildings	Tier I	$1,543,590	Add fire suppression to A and B buildings. Upgraded fire alarms throughout A and B buildings.
	Fire Response System Urgent Needs in the A & B Buildings	Tier I	$9,080	New hardware for double doors.
	Interior ADA Upgrades in the A & B Buildings	Tier I	$31,780	New handrails for interior ramps and stairs in A building.
	Upgrade fire alarms in the High School Gym	Tier I	$185,571	-
	Exterior ADA Upgrades at the Gym	Tier I	$122,579	-
	ADA Compliant Bathrooms in the Gym	Tier I	$136,199	-
	Interior ADA Upgrades in Gym	Tier I	$37,114	-

Hazardous Materials	Abate Asbestos as Needed for New Work	Tier I	$TBD	To be determined based on scope of final project
Security & Access Control	Implement Continuous Live Monitoring Camera System. Expand Exterior Coverage	Tier II	$65,807	-
	Secure Entry Vestibule for Main Entrance in the A Building	Tier I	$226,998	-
		Total:	$7,152,935	

Notes: [1] Cost Estimates include soft costs such as architectural, engineering, and general contracting fess

Eckhart Elementary School

Component	Recommendation	Priority Tier	Cost Estimate [1]	Comments
Building Structure	Identify & Correct Water Infiltration/Drainage Issue Above Atrium	Tier I	$2,631	-
	Demolish Modular Classrooms	Tier III	$98,971	-
	Re-Pour Sidewalks Around Northwest Corner to Properly Shed Water	Tier III	$11,627	-
Building Envelope	Correct Water Infiltration/Drainage Issue Above Atrium	Tier III	$2,631	-
HVAC	Install Packaged Rooftop Unit to Serve Cafeteria – Downsize Boiler to Serve Kitchen.	Tier I	$77,249	-
	Replace Dilapidated Gymnasium Furnace	Tier I	$40,443	-
	Install a Modern Building Management System	Tier I	$127,891	-
	Repair or Replace Boy's Restroom Exhaust Fan	Tier II	$2,169	-
ADA Life Safety Fire Protection	Building Wide ADA Compliant Bathrooms	Tier II	$79,449	-
	Interior ADA Upgrades	Tier I	$59,020	-
	Exterior ADA Upgrades	Tier II	$110,094	-
	Fire Response System Upgrades	Tier I	$703,695	-
Security & Access Control	Implement Continuous Live Monitoring Camera System - Expand Exterior Coverage	Tier II	$31,469	-
		Total:	$1,347,339	

Notes: [1] Cost Estimates include soft costs such as architectural, engineering, and general contracting fess

Fisher's Peak Elementary School

Component	Recommendation	Priority Tier	Cost Estimate [1]	Comments
Building Envelope	Re-roof Library Section & Improve Drainage	Tier I	$9,077	-
Interiors	Tuckpoint Cracked Mortar on Interior CMU Walls	Tier I	$14,948	-
	Repair Water Damaged Walls & Beams in Library	Tier I	$4,085	Due to the roof leak above the library
	Repair Cracked Slabs & Replace Flooring Building Wide	Tier I	$390,707	-
HVAC	Modern Building Management System	Tier I	$182,498	-
	Replace Packaged Rooftop Air Handlers	Tier III	$273,443	-
	Retrofit Gym Air Handler with Cooling	Tier III	$62,924	-
ADA Life Safety Fire Protection	Exterior ADA Upgrades	Tier I	$142,865	-
	Fire Response System Upgrades	Tier III	$164,844	-
	Building Wide ADA Compliant Bathrooms	Tier III	$4,396	-
	Interior ADA Upgrades	Tier III	$2,198	-
Security & Access Control	Implement Continuous Live Monitoring Camera System. Expand Exterior Coverage	Tier II	$30,470	-
		Total:	$1,282,455	

Notes: [1] Cost Estimates include soft costs such as architectural, engineering, and general contracting fess

IX. Future Use Analysis

Overview

A comprehensive renovation of Trinidad Middle School facility systems will bring entire Middle School facility to modern standards of operation and educational environmental standards for the long-term future use of the district.

Upon the completion of this renovation, Future Use Analysis will include detailed information, metrics, narratives, etc. regarding the use of all district facilities and potential paths for both district growth and consolidation as part of our Strategic Plan for Implementation of the Facility Maintenance Master Plan.

Future use analysis of the renovated Middle School facility will be continually analyzed over the next 3-5 years by the Trinidad School District BOE & Administration based on certain metrics, including, but not limited to:

1. Enrollment Trends
2. Budgetary Restrictions
3. Space Utilization
4. Square Foot Per Student
5. Educational Programming Needs

The renovation of the facility will ensure the district has modern K-12 space for both growth or consolidation scenarios in the coming years.

X. Energy, HVAC, O&M Analysis

Utility Analysis

The District's buildings receive electricity, natural gas, water, and sewage services from the City of Trinidad. The rates for the different commodities are summarized below.

The City of Trinidad provides the District facilities with electricity, natural gas, water, and sewage services.

Electricity

Each school is on the large light and power rate structure as follows:

- Monthly customer charge: $25.00
- Summer months (June – September)
    - $0.1231/kwh
    - Demand – $10/kW
- Winter months (June – September)
    - First 10,000 kwh - $0.1231/kwh
    - Additional kwh – $0.1131/kwh
    - Demand – $7/kW

The electrical consumption rate charged by the City of Trinidad is roughly equal to the regional average. The average retail price of electricity in the commercial sector of the west north central region, which includes the state of Colorado is $0.117/kwh. (Energy Information Administration, Electric Power Monthly).

Natural Gas

Each school is on the standard natural gas rate structure which applies to all buildings in the city.

- Monthly customer charge: $9.60
- Gas Supply and Delivery Charge: $0.6586/therm

The natural gas consumption rate charge by the city is roughly equal to the regional average. The average retail price of natural gas in the commercial sector of the region is $0.655. (Energy Information Administration, Electric Power Monthly)

Water/Sewer

Each school is on the standard water rate structure which applies to all buildings in the city.

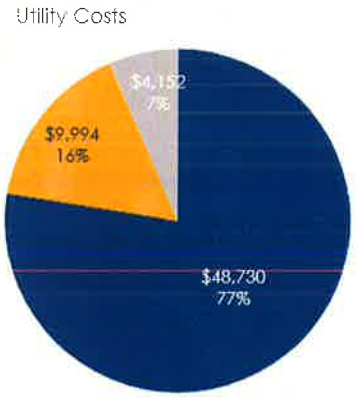
- Monthly customer charge: $25
- Domestic water: $1.65/ccf
- Sewer: $1.77/ccf

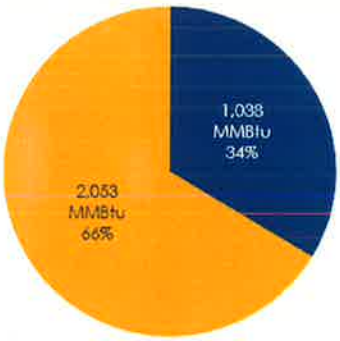
The combined cost of domestic water and sewer services is $3.42/ccf.

Consumption Analysis

The information shown below is designed to visually characterize the annual utility consumption and expenditures experienced by each of the district's facilities. Understanding a building's electricity, fuel, and water usage is paramount to predicting future energy consumption, analyzing various system types' impact, and eventually estimating savings. In all graphs and charts below, bars or pie-pieces which are blue represent current electrical usage, yellow items represent current fuel usage, and grey items represent water usage. Conclusions about each building are summarized under the consumption summary.

Fishers Peak Elementary

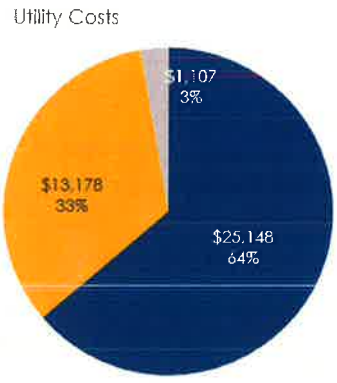


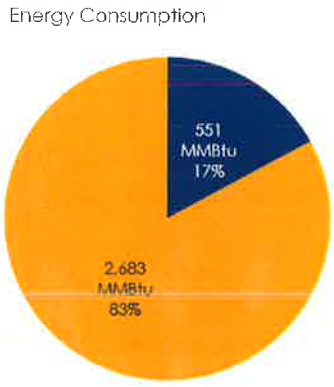


Gross area:	44,154
Total occupants:	324
Total kWh:	304,240
Total kW:	1,605
Electric Cost:	$48,730
Total Therm:	20,527
Fuel Cost:	$9,994
Total kGal:	1,965
Water Cost:	$4,152
Total Utility Cost:	$62,876
kWh/sf-yr:	6.9
LF:	0.26
CF/sf-yr	46.5
Total EUI:	70.0
Gal/occ-day	16.62
Electric $/sf-yr	$1.10
Fuel $/sf-yr	$0.23
Water $/sf-yr	$0.09
Total $/sf-yr	$1.42

Conclusions: The building has an average Use Intensity (EUI) of 70. Due to the high cost of electric re-heat boxes, electrical consumption makes up most of the utility costs. The building has a relatively high density of equipment and occupants which partly explains its high total $/sf-yr of $1.42.

Eckhart Elementary School



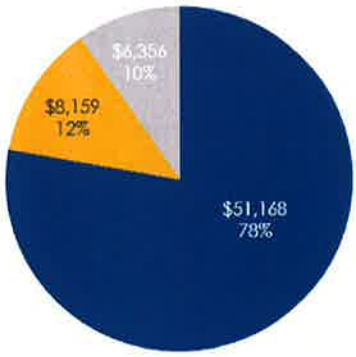


Gross area:	26,361
Total occupants:	80
Total kWh:	161,520
Total kW:	689
Electric Cost:	$25,148
Total Therm:	26,835
Fuel Cost:	$13,178
Total kGal:	459
Water Cost:	$1,107
Total Utility Cost:	$39,433
kWh/sf-yr:	6.1
LF:	0.33
CF/sf-yr	101.8
Total EUI:	122.7
Gal/occ-day	15.73
Electric $/sf-yr	$0.95
Fuel $/sf-yr	$0.50
Water $/sf-yr	$0.04
Total $/sf-yr	$1.50

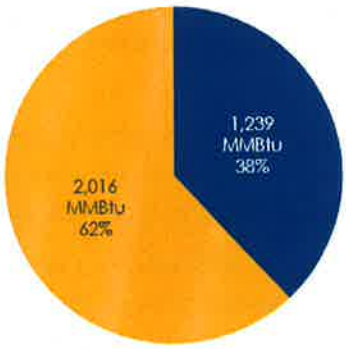
Conclusions: The building has a very high Energy Use Intensity (EUI) of 122. This is primarily due to the continued operation of the extremely inefficient atmospheric boiler serving the cafeteria. Additionally, poor scheduling is likely contributing to the inefficiency of the building.

Trinidad Middle School

Utility Costs



Energy Consumption



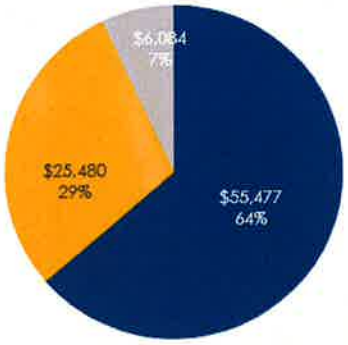
Gross area:	123,000
Total occupants:	463
Total kWh:	363,022
Total kW:	1,130
Electric Cost:	$51,168
Total Therm:	20,163
Fuel Cost:	$8,159
Total kGal:	1,741
Water Cost:	$6,356
Total Utility Cost:	$65,683
kWh/sf-yr:	3.0
LF:	0.45
CF/sf-yr	16.4
Total EUI:	26.5
Gal/occ-day	10.30
Electric $/sf-yr	$0.42
Fuel $/sf-yr	$0.07
Water $/sf-yr	$0.05
Total $/sf-yr	$0.53

Conclusions: The building has a relatively low Energy Use Intensity (EUI) of 27. On average, most schools have an EUI between 50 and 70. The relatively low utility cost is due to a variety of reasons:

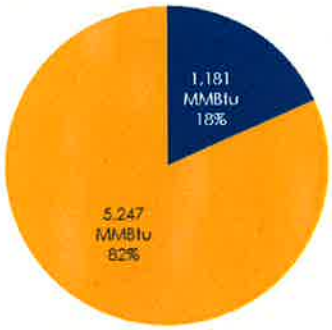
- The building does not have any cooling
- Most rooms utilize baseboard convection for heat. There is very little fan energy consumed per unit area.
- Many of the rooms are unoccupied

Trinidad High School (A Building, B Building, and Gymnasium)

Utility Costs



Energy Consumption



Gross area:	100,000
Total occupants:	185
Total kWh:	346,240
Total kW:	1,856
Electric Cost:	$55,477
Total Therm:	52,471
Fuel Cost:	$25,480
Total kGal:	2,462
Water Cost:	$6,084
Total Utility Cost:	$87,042
kWh/sf-yr:	3.5
LF:	0.26
CF/sf-yr	52.5
Total EUI:	64.3
Gal/occ-day	36.47
Electric $/sf-yr	$0.55
Fuel $/sf-yr	$0.25
Water $/sf-yr	$0.06
Total $/sf-yr	$0.87

Conclusions: The building has an average Energy Use Intensity (EUI) of 64. On average, most schools have an EUI between 50 and 70. Since there is no cooling in the gymnasium and B Building, the energy use is dominated by heating.

O & M Analysis

The Trinidad Middle School HVAC equipment is over 25 years old and is experiencing continuous maintenance issues. In addition to the age of the equipment, the system cannot cool and is not providing adequate ventilation. Consequently, the building is very uncomfortable during hot days and the air quality within the facility is poor.

The Middle School HVAC system utilizes hot water baseboard heating for most of the spaces. The gyms, cafeterias, and auditoriums utilize rooftop furnaces. At 25 years old, the components of the system have reached the end of their ASHRAE recommended lifespans and are due for replacement.

To effectively solve the issues involving deteriorating equipment, lack of cooling, and poor ventilation several options for a replacement HVAC system will be proposed. The system shall also have cooling and an effective ventilation system.

Mechanical Systems Existing Conditions

Trinidad Middle School

Trinidad Middle is a heating only facility, except for a split DX system serving the offices.

The Middle School was originally built in 1911 and has received multiple expansions and renovations since then. A gym and auditorium were added in 1922 and in 1993 the Park St school, a unique building constructed in 1964, was incorporated into the middle school with an adjoining atrium.

The 1911 building and 1964 addition classrooms all have hot water baseboard convectors. None of these rooms have cooling and get extremely uncomfortable in the spring and summer which impacts the performance of the students. The classrooms contain operable windows, but many of the windows are in poor condition and cannot stay open. Consequently, the classrooms throughout the building receive very little ventilation air. The lack of ventilation air is having an adverse effect on the air quality in the school

The 1922 gymnasium, 1922 auditorium, 1993 cafeteria, and 1993 gym are conditioned by rooftop furnaces. Like the rest of the building, these spaces lack cooling and become miserable during hot days. Additionally, they are likely receiving inadequate ventilation air. All the units have exceeded their 15-year ASHRAE recommended lifespan and are due for replacement.

All section of the building, which includes the gyms, classrooms, cafeteria, and auditorium are not supplied with ventilation air by the existing HVAC equipment or are supplied with inadequate ventilation air. Unfortunately, many of the windows do not stay open which makes it difficult to utilize the operable windows to provide sporadic ventilation.

The absence of cooling in all the Middle School the primary thermal comfort issue.

When students and teachers are uncomfortable, their scholastic performance suffers. It is imperative to bring the school up to modern comfort standards.

Dilapidated rooftop furnaces heat the 1922 gymnasium. They have reached the end of their serviceable life.

Hot water baseboard convectors heat most of classrooms and hallways in the school. The units do not provide ventilation air.

None of the spaces in the building, including the auditorium, have cooling. A packed play can become extremely uncomfortable without proper cooling.

The High School Gym boilers are over forty-five years old. They are extremely inefficient and are difficult to maintain.

The packaged rooftop units serving the 2002 spaces are over 15 years old. They are due for replacement.

The boiler serving the Eckhart cafeteria is in poor condition and is due for retirement. A single gas/DX rooftop unit should be installed above the cafeteria to provide heating and cooling.

The rooftop units at Fishers Peak are over 15 years old. The district should budget for their replacement in the next 1 to 3 years.

Trinidad High School

Trinidad High School is comprised of three buildings constructed in 1972. The A building contains most of the classrooms and the facility received an HVAC renovation in 2012. All rooms are conditioned by gas/DX rooftop units that are in good condition. The B building contains the vocational classrooms and is still conditioned by the original hot water heating system installed in 1972. The boiler providing heat to the system is in poor condition, the rooms lack cooling, and the rooms have poor ventilation. It is time to provide the B building with high efficiency gas/DX rooftop units like those at the A building. The High School gym is conditioned by large hot water handler's original to the 1972 construction. The boilers providing heat to the system are grossly oversized and are over 45 years old. They are extremely inefficient and difficult to maintain. The building needs a new condensing boiler plant that is efficient to operate and maintain.

Eckhart Elementary

Eckhart Elementary is comprised of an original 1964 building and a 2002 addition. The classrooms in the 1964 building recently received gas/DX rooftop units in 2012. The units are in good condition. The rooms in the 2002 addition are still conditioned by the equipment that was installed at the time of construction. This includes a gas rooftop furnace and a gas/DX rooftop unit. Both units are at the end of the their ASHRAE recommended 15-year lifespan and are due for replacement.

A dilapidated boiler serves the cafeteria and bathrooms in the 1964 building. The boiler is inefficient and difficult to maintain. It has reached the end of its 25 year ASHRAE recommended lifespan and is due for retirement. The hot water system should be replaced with a single gas/DX rooftop that conditions the cafeteria. The new high-efficiency unit will provide the cafeteria with cooling during the swing seasons and will be easier to maintain.

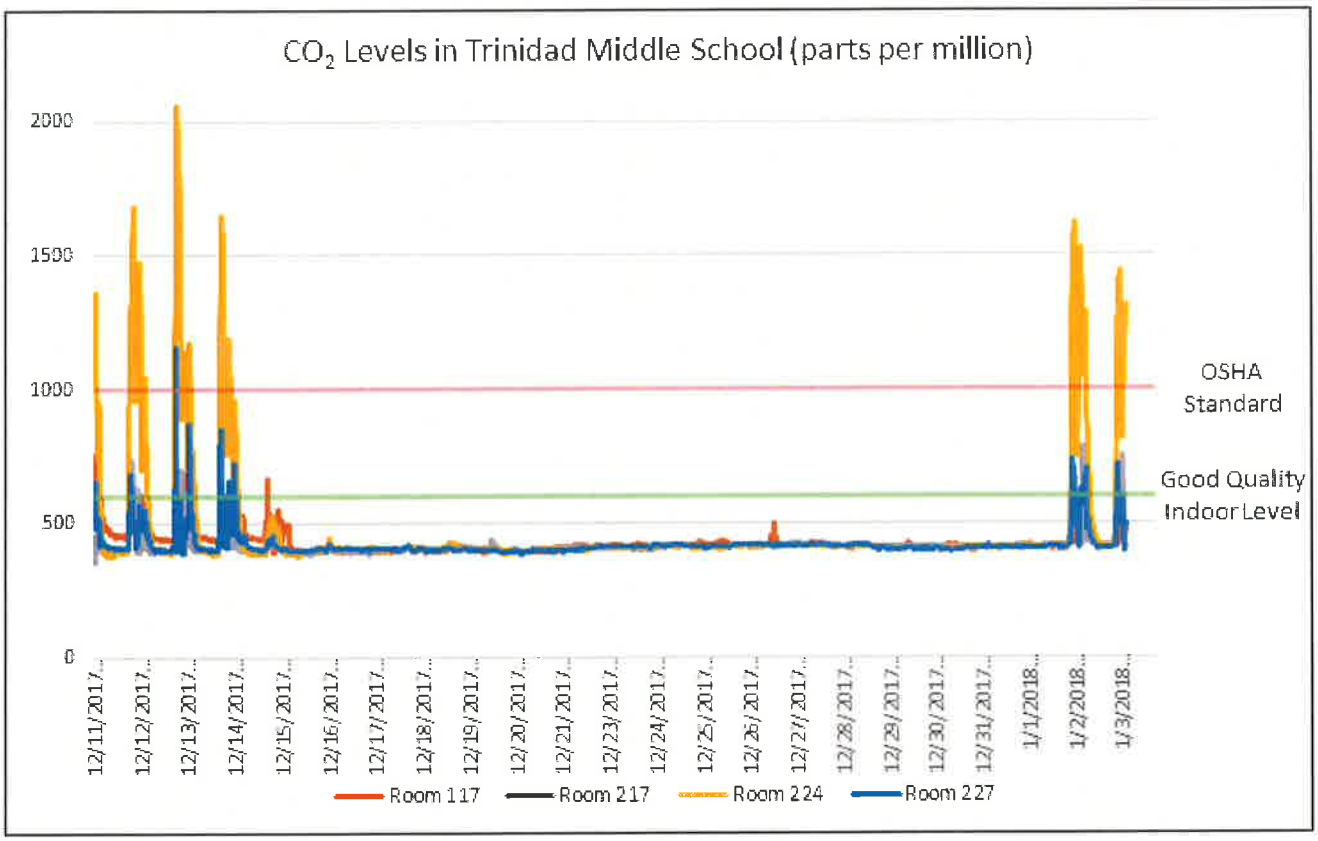
Fishers Peak Elementary

The classrooms in Fishers Peak Elementary are conditioned by a VAV system comprised of electric reheat boxes and gas/DX air handlers. The air handlers are over 15 years old and are at the end of their ASHRAE recommended lifespan. The district should budget for the replacement of the air handlers in the next 1 to 3 years. The gymnasium is conditioned by a gas fired indoor air handler. During the spring and fall, the gym becomes very uncomfortable due to the lack of cooling. The most cost-effective solution is the installation of a new evaporator coil in the existing indoor air handler. A high efficiency condensing unit will be installed on the roof to reject heat from the coil.

Ventilation – Carbon Dioxide Assessment

As part of this assessment, carbon dioxide (CO_2) sensors were placed in various classrooms around the Middle School to measure the air quality in this building where a comprehensive HVAC project is being recommended to get a sampling of the building's current air quality. These classrooms were 117, 217, 224, and 227.

The sensors were placed in these rooms and recorded CO_2 levels every 15 minutes from December 11th, 2017 to January 3rd, 2018. The data they collected are presented in the below graph for easy visual evaluation:



Carbon Dioxide Measurements Key Metrics

- CO_2 concentrations are measured in parts per million (PPM)—that is the number of CO_2 molecules that are found in one million molecules of air.
- CO_2 concentration levels that match outdoor conditions are the lowest that should be possible in an indoor space, and this is typically around 450 PPM.
- Normally, concentrations of CO_2 at or below 600 PPM are considered good indoor air quality.
- The maximum allowed concentration of CO_2 that can be designed for supplying ventilation air according to OSHA and ASHRAE standards is 1,000 PPM.
- At concentrations above this level, building occupants begin to experience decreased levels of performance, concentration, and productivity and temporary physical symptoms such as headaches, drowsiness, and eye or throat irritation which should resolve quickly after being removed from the exposure.
- At concentrations above 2,500 PPM, occupants can begin to experience longer-term adverse health effects that do not resolve immediately when they are removed from the unhealthy exposure.

Window & Door Ventilation

If a comprehensive HVAC renovation is conducted with inefficient, leaky windows and doors not replaced or at least re-sealed at the same time, the result will be a building that operates with many of the same inefficiencies and poor comfort and ventilation issues that existed before the HVAC project at a larger-than necessary installation cost.

For all these reasons, it is highly recommended that the replacement of all exterior windows and doors that were identified as a need in this assessment be undertaken in conjunction with the recommended HVAC renovation project. The exterior window and door systems of the Middle School are old, poor insulators, and were designed to be operable but are largely no longer functional.

Modern window and door systems have much better thermal performance than older systems because of double panes, thermal-break technology in their frames, and low-emissivity coatings on glass. A thermal break means that there is no contiguous metal conductor to carry heat from one side of the building envelope to the other. Heat transfers through these frames much more slowly than in traditional metal frames which have uninterrupted conduction of heat through them. Low-emissivity glass coatings block certain wavelengths of radiation from the sun that carry heat but let through the wavelengths of visible light.

Infiltration of unconditioned, outside air into a building can be drastically reduced by re-sealing or replacing old windows and doors and the insulation of a building envelope can be dramatically improved by upgrading these systems with modern, high-efficiency components. These changes improve the indoor air quality, safety and thermal comfort of building occupants.

It enables the new HVAC system to be more appropriately sized and designed to serve only the thermal loads that are intrinsic to the building and its occupants, and not wasted on unnecessary infiltration, heat gains and losses due to poor insulation.

This can reduce the first costs of a new HVAC system significantly by reducing its required capacities for heating and cooling, and reduces the operating costs of a new HVAC system by enabling it to operate more efficiently.

Ventilation Conclusion

The graph above demonstrates that the majority of the 1911 portion of the Middle School is likely not receiving adequate levels of ventilation air to maintain indoor air quality at levels within OSHA and ASHRAE standards on almost every day that the building is occupied.

The rooms with CO_2 concentrations that are close to or within acceptable standards are rooms whose teachers reported more frequently using the operable windows regardless of the ambient air temperature outside. Those rooms with teachers who are probably more sensitive to the thermal discomfort that results from opening windows regardless of outside air temperature are the rooms that have notably worse air quality.

This method of relying only on operable windows (which are largely broken throughout this building) and the discretion of individual room occupants who can be sensitive to thermal discomfort to supply fresh ventilation air is not sufficient to ensure that all occupants are receiving appropriate levels of ventilation air.

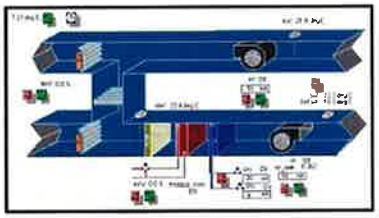
A new HVAC system that is properly designed and operated to maintain acceptable levels of CO_2 concentrations is needed in this building to correct the problem and should be planned for immediately and implemented as soon as possible to ensure the health and optimal performance of the faculty and students of the Middle School.

Building Automation Control System Existing Conditions

Equipment in the Middle School is controlled by an outdated and convoluted Johnson control system installed in 1993. The maintenance staff cannot modify setback temperatures, implement equipment scheduling, and monitor ventilation. The maintenance staff is short staffed and the difficult control system adds significant stress to their already very demanding job.

Equipment in the High School and Eckhart Elementary are controlled by individual unit thermostats. The maintenance staff cannot implement scheduling or monitor the system remotely. The control systems in these buildings adds further stress to the overburdened maintenance staff.

Stand-alone thermostat



DDC control system graphic

DDC HVAC equipment scheduling

Building Automation System Solutions

New building management systems are proposed for the middle and high schools. All HVAC equipment at the schools will be able to be controlled from a laptop computer and over the internet. Equipment can be scheduled to setback the space temperature and close outside air dampers during unoccupied periods to reduce heat loss and propane usage during these hours. More advanced control sequences can be implemented with these digital controls such as demand controlled ventilation (CO2 control), variable volume pumping, supply air temperature reset, static pressure reset, optimal start, and many more. These sequences are aimed at optimizing comfort and energy efficiency. A large portion of energy savings attributed to the new HVAC system will be predicated upon control system optimization.

New HVAC and control systems installed by 360 Energy Engineers undergo a rigorous commissioning process, which insures that issues will be caught and remedied before contractors leave the site. The process furthermore insures the adherence of the work to the design intent and acts as a method of quality control. In general, projects which are commissioned use 16% less energy, result in a more comfortable building, and pass far fewer issues on to the customer post-construction.

Lighting Systems Existing Conditions

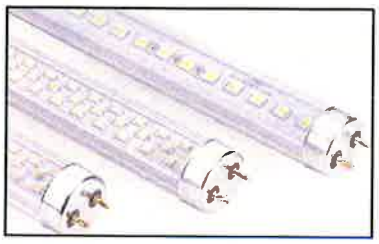
Typical T8 Lighting Fixtures

The lighting throughout Trinidad School District is primarily standard-efficiency T8 fluorescent fixtures with solid state ballasts. High bay area lighting consists of high output T8 fluorescent fixtures. Some areas, particularly the hallways, appear to be over-illuminated (per IES guidelines). There are currently no occupancy controls on any fixtures in the building.

Exterior lighting consists of metal halide wall packs.

Lighting Systems Solutions

LED Lighting Retrofits



LED retrofit lamps

This recommendation includes replacing all T8 32-watt lamps and ballasts with the latest and most efficient product in lighting technology – LED lamps. LED lamps are 50%+ more efficient than T8s.

LED lamps also have extremely long life. The average life of the lamp is 50,000 hours, compared to typical T8 lamps, which are rated at 20,000 or 25,000 hours. The performance of the LED lamp is also guaranteed by the manufacturer for five years, whereas T8 fluorescent lamps have only a one-year warranty.

LED wall pack fixtures

Additionally, unlike fluorescent lamps, LED lamps do not require ballasts to operate. LEDs have a built-in driver that converts AC current to DC current to power the diodes, and this driver is covered by the manufacturer's five-year warranty as well. This further reduces the maintenance cost of LED lamps over fluorescents.

In the areas with high light levels, 4 lamp T8 fixtures will be replaced with 2 lamp LED fixtures where appropriate to maintain IES recommended light levels. Additionally, all incandescent lamps will be replaced with LED equivalents.

Lighting occupancy sensors

In recent years, LED lamps have become viable sources for outdoor lighting as well, offering good color quality and better control options than HID sources and are also more energy efficient and have a longer lamp life.

Occupancy-Based Lighting Control

Reducing the connected load of the lighting system represents only one part of the potential for maximizing energy savings. The other part is minimizing the use of that load through automatic controls. Automatic controls switch lighting based on occupancy. In situations where lighting may be on longer than needed, left on in unoccupied areas, or used when sufficient daylight exists, 360 Energy Engineers would install automatic controls.

Site observations revealed that lighting fixtures in some of the public spaces remain on many times when spaces are not being occupied. Energy used for lighting could be significantly reduced by turning off lighting fixtures in these spaces when they are unoccupied.

Included in this measure is installation of occupancy sensors in the conference room, break room, and all four bathrooms. These publicly used rooms are spaces that can frequently have their lights remain on when the rooms are not occupied.

Plumbing Systems Existing Conditions

The plumbing fixtures in the building restrooms are standard flow type. The toilet flush valves were observed to be standard flush volume of approximately 1.6 gallons per flush, consuming marginally more than modern 1.28 gpf fixtures. The lavatory sinks have a standard 2.2 gallon per minute aerator. Urinals were observed to be 1.0 gpf.

Typical bathroom fixtures

Plumbing Systems Solutions

Plumbing Fixture Replacements

Significant water savings can be achieved by retrofitting the existing urinal with 0.5 gpf valve diaphragms or replacing the entire fixture with 0.25 or 0.13 gpf fixtures. Modern low flow aerators can achieve 0.5 gallons per minute while still achieving adequate coverage – providing a cost-effective alternative to the current operation. Toilets can be replaced with 1.28 gpf fixtures.

Plumbing system throughout the district would be visually inspected with a camera to verify the extent of deteriorated piping or source of sewer backups, and respective sections would be replaced.

Low flow faucet aerator example

Energy Codes

Trinidad School District is mandated to comply with the 2015 International Energy Conservation Code (IECC). The follow are areas in which the current HVAC systems may be falling short of this code:

1. C403.2.4.1.2 Deadband. Where used to control both heating and cooling, zone thermostatic controls shall be capable of providing a temperature range or deadband of at least 5°F (2.8°C) within which the supply of heating and cooling energy to the zone is capable of being shut off or reduced to a minimum.
2. C403.2.4.2.1 Thermostatic setback capabilities. Thermostatic setback controls shall have the capability to set back or temporarily operate the system maintain zone temperatures down to 55°F (13°C) or up to 85°F (29°C).
3. C403.2.5 Hot water boiler outdoor temperature setback control. Hot water boilers that supply heat to the building through one- or two-pipe heating systems shall have an outdoor setback control that lowers the boiler water temperature based on the outdoor temperature.
4. C403.4.1.3 Set points for direct digital control. For systems with direct digital control of individual zones reporting to the central control panel, the static pressure set point shall be reset based on the zone requiring the most pressure. In such case, the set point is reset lower until one zone damper is nearly wide open.
5. C403.4.4.4 Fractional horsepower fan motors. Motors for fans that are not less than 1/12 HP (0.082 kW) and less than 1 HP (0.746 kW) shall be electronically commutated motors or shall have a minimum motor efficiency of 70 percent.
6. C403.4.4.5 Supply air temperature reset controls. Multiple zone HVAC systems shall include controls that automatically reset the supply air temperature in response to representative building loads, or to outdoor air temperature. The controls shall be capable of resetting the supply air temperature not less than 25 percent of the difference between the design supply air temperature and the design room air temperature.
7. C405.2.1 Occupant sensor controls. Occupant sensor controls shall be installed to control lights in certain space types.
8. C403.2.6 Ventilation. Ventilation, either natural or mechanical, shall be provided in accordance with Chapter 4 of the International Mechanical Code. Where mechanical ventilation is provided, the system shall provide the capability to reduce the outdoor air supply to the minimum required by Chapter 4 of the International Mechanical Code.
9. C403.2.6.1 Demand controlled ventilation. Demand control ventilation (DCV) shall be provided for spaces larger than 500 square feet (46.5 m) and with an average occupant load of 25 people per 1,000 square feet (93 m) of floor area (as established in Table 403.3 of the International Mechanical Code).

XI. Square Footage Analysis

Trinidad School District 1 facilities square footage and student metrics are as follows:

Facility	Space Utilization	Ft²	Students	Ft²/Student	Built/Additions
Trinidad Middle School	Classrooms Gym Cafeteria Library Offices	115,658	236	490	1911 1922 1964 1993
Trinidad High School	Classrooms Gym Cafeteria Library Auditorium Wood/Metal Shops Offices	79,294	272	292	1972
Eckhart Elementary School	Classrooms Multipurpose Room Library Offices	25,844	136	190	1964 2002
Fisher's Peak Elementary School	Classrooms Multipurpose Room Library Offices	45,630	341	134	2002
High School Gym	Gym Locker Rooms	43,120	-	-	1972
Total	-	309,546	985	-	-

Current Capacity of Facilities

Building	Existing Enrollment	Building Capacity	Classroom Spaces	Needed Classroom Spaces	Auxiliary Spaces	Needed Auxiliary Spaces
Eckhart Elementary	136	264	15	13	1	5
Fisher's Peak Elementary	337	572	25	23	7	7
Trinidad Middle School	235	733	44	14	11	2
Trinidad High School	272	600	35	24	9	0

XII. Site Evaluation

Trinidad Middle School

Bus Route Pattern

There is currently a safe district bus route for student pick up and drop off at the school. Busses enter from Park St. and head along the west side of the district property. The busses drive across the front entrance of the school, in a clearly delineated road for busses only. The route rounds the southwest corner of the Middle School to the designated student drop off/pickup location. The busses then exit the East Parking Lot onto Hillside St. or Willow St.

Student & Parent Access

Like the busses, cars enter from Park St. and head along the west side of the district property. Parents drive across the front entrance of the school, in a clearly delineated road for drop off only. Unlike the busses, parent drop off is at the front of the school, at the Atrium, and is designated student drop off location. Cars then continue along the front of the school and exit the onto Hillside St. or Willow St.

In the afternoon, the students are picked up in the same location as the bus route, in the east parking lot at the

Emergency & Fire Department Access

Emergency responders have access to Middle School through the main entrance of the school. In case of emergency, emergency responders have an access code to open a "knock box", which contains keys to access the buildings.

Bus Route & Student Drop Off/Pick up Location

- Drop Off/Pickup Location
- Parent Drop Off Location

Bus route entrance via Park St.

Clear Route Signage

East Parking Lot exiting onto Hillside or Willow St.'s

Parking Lots & Roads

The Middle School campus has two distinct parking lots around the main building. They are located at the front of the main entrance, and behind the school on the west side. Each parking lot has handicap accessible parking spots, although limited.

The primary access road to the school is via Park St. The school is also accessibly via Hillside & Willow St.'s to the rear of the building.

The condition on these parking lots and roads are poor and overdue for a comprehensive replacement.

Miner's Stadium

Sports Fields & Playgrounds

Miner Stadium, the primary sports field for the district, is location to the south of the Middle School, and east of the High School. The stadium was built in 1927 and includes a grass field, concrete stadium seating and field lights.

Primary Sports Field & Track

ADA Compliance

Exterior ADA needs are detailed in the Facility Evaluation of this report. Recommended upgrades include:

1. Improve marking and signage of accessible parking space and re-pave path to accessible entrance
2. Replace accessible ramp and rails to main entrance of 1911 building
3. New accessible ramp for Park Street upper-level entrance

Typical deteriorated parking lot & asphalt conditions

Site Utilities

Under Construction.

Site Drainage

Drainage around the Middle School and High School properties is a significant issue, and should be address. Runoff drains to a location between the schools and has extensively deteriorated parking lots, sidewalks and roadways.

Storm water drainage from the roof of the auditorium is directed out spillways or partial downspouts that make the water run down the southeast façade of the building rather than in downspouts all the way to ground level. Over time, this will lead to further, severe deterioration of the brick façade of this part of the building, and has resulted in exterior and interior water penetration.

Deterioration from poor drainage

Acreage

17 (combined with High School)

Signage

Facility signage throughout the district is generally adequate, although it was noted that additional ADA directional signage is lacking.

Poor site drainage

Trinidad High School

Bus Route Pattern

There is currently a safe district bus route for student pick up and drop off at the school. Busses enter from Park St. and head along the west side of the district property. The busses drive across the front entrance of the school, in a clearly delineated road for busses only. The route rounds the southwest corner of the Middle School to the designated student drop off/pickup location. Students then walk a short distance East to the High School. The busses then exit the East Parking Lot onto Hillside St. or Willow St.

Student & Parent Access

Parent and Student access is located along West St., at the main entrance of the Trinidad High School A Building. Car routes enter on one-way traffic on West St., mainly via Hillside St. along the north of the High School.

Bus Route & Student Drop Off/Pick up Location

- Bus Drop Off/Pickup Location
- Parent Drop Off/ Pickup Location

Entrance via Park St.

Clear Route Signage

East Parking Lot exiting onto Hillside or Willow St.'s

Emergency & Fire Department Access

Emergency responders have access to High School through the main entrance of the school. In case of emergency, emergency responders have an access code to open a "knock box", which contains keys to access the buildings.

Parking Lots & Roads

Both primary parking lots at the Middle School, and the access roads throughout the property are in extremely poor condition.

Sports Fields & Playgrounds

See Trinidad Middle School

ADA Compliance

Exterior ADA needs are detailed in the Facility Evaluation of this report. Recommended upgrades include:

1. Install new accessible ramp to lower level of the B building
2. Install new accessible ramp to upper level of the B building
3. Install new accessible ramp between the A and C buildings
4. Replace hand and guard rails on all external stairs between the three buildings
5. Replace hand rails on all exterior staircases of C building
6. Install guard rail around entire roof deck of C building
7. Replace damaged concrete walkway to accessible entrance of C building

Site Utilities

Under Construction.

Site Drainage

Drainage around the Middle School and High School properties is a significant issue, and should be address. Runoff drains to a location between the schools and has extensively deteriorated parking lots, sidewalks and roadways.

Acreage

17 (combined with Middle School)

Signage

Facility signage throughout the district is generally adequate, although it was noted that additional ADA directional signage is lacking.

Primary Sports Field & Track

Primary Sports Field & Track

Security Signage

High School handicap parking spot

Handicap Parking Signage

Eckhart Elementary

Bus Route Pattern

There is currently a safe bus route for student pick up and drop off at the school. Busses enter from Washington St. and head south, along the east side of the district property. The busses drive across the front entrance of the school. The route passes the front of the school to the designated student drop off/pickup location at the corner of Pierce St & Adams St. The busses then exit east onto Adams St.

Although the bus route is clear and safe, the root causes significant congestion with parent drop off.

Student & Parent Access

In the morning, parents enter from Washington St. and head south, along the east side of the district property. Parents drop off students at the front entrance of the school, then exit east onto Adams St. In the afternoon, parents park in a parking lot south of Adams St. The parents then must walk to the front of the school to pick up students and walk them back to the cars.

Although the route is clear and safe, there is significant congestion along with the bus routes in the mornings.

Bus Route & Student Drop Off/Pick up Location

- Bus Drop Off/Pickup Location
- Parent Drop Off Location (a.m. Only)
- Parent Pickup Location
- Parents Walk to Pick Up Students

Bus Route Drop-off/Pickup Location

Parent Pick Up Parking Lot

Emergency & Fire Department Access

Emergency responders have access to Eckhart Elementary through the main entrance of the school. In case of emergency, emergency responders have an access code to open a "knock box", which contains keys to access the buildings.

Parking Lots & Roads

Parking lots at Eckhart Elementary were improved in 2002 as part of the bond issue to build Fisher's Peak Elementary. Generally, money was not set aside for proactive maintenance, specifically to address crack sealing, gotten large and started to break away.

Sports Fields & Playgrounds

Eckhart Elementary has a full-sized playground area and concrete outdoor court, located southeast of the main entrance. The area is well secured.

ADA Compliance

Eckhart Elementary lacks any accessible parking and an accessible entrance path from the gravel parking lot, and nearly all the schools have inadequately marked accessible parking spots and problematic entrance paths from those spots into the buildings. All the elementary schools have playground surfaces that do not meet modern fall protection standards, and these playground areas lack accessible ramps.

Site Utilities

Generally, the utility connections for the schools are adequately secured against damage with fences, curbs, bollards or outbuildings.

Site Drainage

There are no drainage issues at Eckhart Elementary. In the 2002, the roof drains were redone as part of the 2002 bond.

Acreage

3.4

Signage

Facility signage throughout the district is generally adequate, although it was noted that additional ADA directional signage is lacking.

Bathroom accessibility issue

Eckhart playground/sports area

Onsite drainage

Alarm pull bar and strobe system

Fisher's Peak Elementary

Bus Route Pattern

Busses for Fisher's Peak Elementary School enter off Moores Canyon Rd. to the primary roundabout. The busses pull to the front of the school and drop off/pickup students at the main entrance. Busses then proceed around the roundabout to exit back onto Moores Canyon Rd.

Student & Parent Access

Parent drop off/pickup for Fisher's Peak Elementary School enters off Moores Canyon Rd. to a secondary roundabout east of the primary roundabout. Parents pull up to a sideway near the main entrance of the school and drop off/pickup their students. Student then walk to the main entrance, and vehicles continue along the roundabout to exit onto Moores Canyon Rd.

Below are route patterns for pickups and drop offs at the school:

Bus Route & Student Drop Off/Pick up Location

- Bus Drop Off/Pickup Location
- Parent Drop Off/ Pickup Location

Bus Drop off & pick up location

Parent/Student drop off and pick up location

Parent roundabout

Emergency & Fire Department Access

Emergency responders have access to Fisher's Peak through the back entrance of the school. In case of emergency, emergency responders have an access code to open a "knock box", which contains keys to access the buildings.

Parking Lots & Roads

Paving the parking lots at Fisher's Peak Elementary was not included in the 2002 construction of the facility, and were left the parking lot graveled. Parking lot area is adequate, but completing the paving of these areas is recommended.

Sports Fields & Playgrounds

Under Construction.

ADA Compliance

The exterior of Fisher's Peak Elementary does not have any notable ADA issues, other than the need to replace the playground surface with engineered wood fiber and install an accessible ramp.

Site Utilities

Under Construction.

Site Drainage

There are no drainage issues at Fisher's Peak Elementary. In 2006, a minor project tied the roof drains to storm sewers located in the back of the property.

Acreage

22 acres

Signage

Facility signage throughout the district is generally adequate, although it was noted that additional ADA directional signage is lacking.

Secure main entrance


Emergency defibrillator machine


Accessible fire extinguisher

XIII. Technology

Technology Topology

Type of Cabling

Currently all connections from the MDF and building level IDFs are CAT5e.

Recommendations: Replacement of the CAT5e connections from the building MDFs to closet IDFs would with Fiber Optic connections would be beneficial. It would allow for faster connections, more connections, less traffic congestion, and aid in future proofing buildings.

Type and Age of Hardware

The network IDF switches in all buildings are all at least 15 years old. The two core switches, one (1) in the main data center is 10 years old and the one in the High School is 17 years old and because of its architecture limits the addition of new PoE devices in the High School.

Recommendations: Replacing all switches district wide with newer, faster, and more scalable models to allow for faster connection speeds.

Source of Bandwidth and Internet Connectivity

Currently our intra-building connectivity is a 100MB fiber connection and our Internet connection is also Fiber feed with a connection speed of 60MB

Recommendations: Intra-building speeds as well as the internet connection could be increased to better handle and allow for faster access to internet related content

Network Infrastructure

Data network equipment

Please refer to Cabling and Age of Hardware heading

Voice Network Equipment

Currently one of the elementary schools is running a PBX, which was damaged by lighting in the spring of 2016 and is dire need of replacement. The rest of the district is running on a VoIP system, FreePBX which currently has no way to support or expand it capabilities and we are experiencing difficulties with outside calls reaching the intended extensions.

Recommendations: We are currently going before the Board of Education with a plan for a district wide phone system that not only unify all buildings under one phone system, but would also integrate with existing overhead paging systems and provide mobile and remote access to all users along with presence and IM capability.

Firewall and Security

We are running a Cisco ASA 515 firewall that has reached its End of Life and End of Service leaving us vulnerable to ever increasing cyber threats that exist. Same can be said for our Content filter, which we are required by law to have in place to prevent access to age in appropriate connect. A plan is being presented to the Board of Education to replace both items with more modern and robust equipment.

Backup and Recovery

We have no source of back or recovery for any of our compunction systems, i.e. voice mail and/or email as well as user files or other pertinent data.

Recommendations: A data center refresh with new servers, premise backup, and server redundancy along with cloud based backs is necessary

Availability and Campus Connectivity

Please refer to Page 1 cabling and connectivity

System Standard & Specifications

Operating Systems

We are running Windows 7 Enterprise edition on all desktop and laptops.

Recommendations: Upgrading to the newest or a newer version of Windows would require new hardware in all classrooms, offices, and labs as the age of the equipment prevents it from running anything more than Windows 7. In addition, new servers would be required to allow for the deployment, management and support of new hardware and OSs

Email Services

Email is currently self-hosted using Microsoft Exchange 2003, which passed End of Life, End of Service, and End of Support five (5) years ago. To be able to migrate to Office 365 a complete data center refresh needs to occur along with complete network rebuild to meet with Microsoft's Office 365 requirements.

Wireless Services

Wireless connectivity needs to available in every classroom with the ability to accommodate not only district owned devices, but allowing for BOYD connectivity also.

Educational Technology

Classrooms need to setup with what are current standards for a SMART classroom. Those components are a dedicated workstation/lectern, a current standard pc configuration, a monitor which allows for digital inking and instructional interaction, ceiling mounted speakers, with a sound system capable of handling multiple audio sources, and a projection unit either HD DLP projector or the current standard in HD flat screen displays. Size and quantity dependent on classroom size.

XIV. Strategic Plan for Implementation

Master Plan Recommendations

It is clear to Trinidad School District 1 and the professionals of the Project Development Team that the foundation of future facility capital funding should be centered on addressing these imminent failures with a comprehensive renovation of Trinidad Middle School. Although the district faces an extensive facility needs list across all district facility, as this Master Plan will outline, the district can only responsibility address these improvements in phased approaches.

The comprehensive renovation of Trinidad Middle School is a significant first step in executing the Facility Master Plan goals, and provides the district with a modern educational environment and the foundation of the district for decades to come, as it had for over century before.

The needs of the District in terms of their facilities, while significant from a cost standpoint, are holistic, comprehensive and synergistic and will bring Trinidad Middle School to the modern era. More importantly, it will provide the district with a foundational facility for growth into the future.

The community and, of course, the students within the Trinidad School District have much to gain from these renovations. All would gain from receiving safe and reliable buildings with improved comfort, indoor air quality, better efficiency, and reduced maintenance expensed. Moreover, with renewal of all major interior and exterior infrastructures and systems, there would be a much lower chance of school cancellations due to the failure of critical systems, which currently are many.

The long-range implications of not implementing the scope outlined in the Master Plan would be a high risk of frequent school closures due to heating system failure, lack of cooling and ventilation air, exorbitant maintenance and repair costs due to the inevitability of correcting failures on an emergency basis, a higher risk of a security event due to having an unsecure building, a lack of accommodation for ADA accessibility, deteriorated exterior and site conditions, and more.

The need to bring this facility to a modern K-12 educational standard and ensure its future use will be clearly defined and presented throughout the Facility Maintenance Master Plan and subsequent BEST Grant Application.

Trinidad Middle School

Component	Recommendation	Priority Tier	Cost Estimate [1]	Comments
Building Structure	Remediate Below Grade Walls 1911/1922 Construction	Tier I	$1,315,258	-
Building Envelope	Tuckpoint Entire 1911 Building	Tier I	$608,678	-
	Comprehensive Window Replacement	Tier I	$833,216	-
	Improve Drainage off Auditorium	Tier I	$7,780	-
Interiors	Replace Failing Floor Tiles in 1911 Building - Repair Subfloor as Needed	Tier I	$301,349	-
	Remediate Water Damaged Ceiling Joists in Auditorium - Replace Water Damaged Lights and Ceiling Tile	Tier II	$32,773	-
Electrical	Replace Generator & Add Servers to Back-up Circuit	Tier I	$153,746	-
	Add Additional Outlets in Classrooms	Tier I	$35,789	-
	Building Wide LED Retrofits	Tier II	$352,729	-
	Replace Electrical System in 1964 Park St Addition	Tier I	$230,958	-
HVAC	Classroom Air Source VRF w/ DOAS & Controls	Tier I	$5,854,149	-
	High Efficiency Auditorium Rooftop Units w/ Cooling	Tier I	$134,713	-
	High Efficiency Gym Rooftop Unit w/ Cooling	Tier I	$116,453	-
	High Efficiency Cafeteria Rooftop Unit w/ Cooling	Tier I	$98,193	-
	Fix Bathroom/Lab/Janitor Closet Ventilation Fans	Tier I	$4,282	-
Plumbing	Upgrade fixtures throughout building	Tier II	$64,372	-
ADA Life Safety Fire Protection	Comprehensive Replacement of Exit Doors	Tier I	$132,930	-
	Dedicated bathroom for Nurse's Office	Tier II	$52,223	-
	ADA compliant sidewalks outside 1922 gym	Tier II	$22,041	-
	ADA Compliance & Modern Safety Standards	Tier I	$25,145	Railings around stairwells, code compliant door hardware in Park St, etc.
	ADA Compliant Bathrooms Building Wide	Tier I	$339,331	-
	ADA Access Ramp for Park St. Basement Rooms	Tier II	$9,616	-
	Fire Suppression System for Park St. Building	Tier I	$739,685	-
	Upgrade 1911 Fire Suppression System	Tier I	$758,283	Extend fire alarm system to 1922 gym and upgrade system to include voice evacuation
	Correct Deficiencies in 1911 Fire Suppression System	Tier I	$109,896	Repair exhaust system in auditorium, and fix dry valve in the attic.
Hazardous Materials	Remediate Asbestos as Needed for New Work	Tier I	$TBD	-

Security & Access Control	Implement Continuous Live Monitoring Camera System. Expand Exterior Coverage	Tier II	$55,610	-
	Secure Entry Vestibule for Main Entrance	Tier I	$368,943	-
		Total:	$12,758,141	

Notes: [1] Costs estimates include soft costs such as architectural, engineering and general contracting fees.
[2] Refer to HVAC system alternatives life cycle cost analysis in XIV. Strategic Plan for Implementation

Trinidad High School

Component	Recommendation	Priority Tier	Cost Estimate [1]	Comments
Building Structure	Repair & Correct Drainage or Remove Suspended Sidewalk on East Side of B Building	Tier I	$49,486	-
Building Envelope	Replace B Building Roof	Tier I	$635,072	-
Interiors	Renovate the Chemistry Lab to Meet Educational Intent	Tier I	$TBD	Further collaboration needed with district to generate estimate
Electrical	Expand Electrical Panel Capacity	Tier I	$15,287	-
	Replace B Building MDP Panel	Tier I	$40,411	-
	LED Lighting Retrofit	Tier II	$114,807	-
HVAC	Modern Building Management System for A & B Buildings	Tier I	$186,365	-
	Install Packaged Rooftop Units to Serve B Building Classrooms - Decommission Boiler.	Tier II	$1,011,871	-
	Install Packaged Rooftop Units to Serve B Building Classrooms - Decommission Boiler.	Tier II	$1,011,871	-
	Improve Dust Collection System in the Woodshop	Tier I	$29,691	-
	Repair and Expand Exhaust Hood System for Lab	Tier I	$42,608	-
	Install Smaller, Efficient Boilers in the Gym	Tier I	$794,102	-
	Modern Building Management System in the Gym	Tier I	$101,345	-
	Install Locker Room Ventilation System in the Gym	Tier I	$135,528	-
Plumbing	Install Backflow Preventer	Tier I	$54,434	-
	Renovate Showers in Gym Locker Rooms	Tier I	$67,632	-
	Upgrade Fixtures Throughout Building	Tier I	$27,359	-
ADA Life Safety Fire Protection	Exterior ADA Upgrades at the A & B Buildings	Tier II	$183,869	New ramps to the B building upper and lower levels. New ramp between A building and the gym. Code compliant handrails around stairs.
	ADA Compliant Bathrooms at the A & B Buildings	Tier I	$292,479	
	Fire Response System Upgrades in the A & B Buildings	Tier I	$1,543,590	Add fire suppression to A and B buildings. Upgraded fire alarms throughout A and B buildings.
	Fire Response System Urgent Needs in the A & B Buildings	Tier I	$9,080	New hardware for double doors.
	Interior ADA Upgrades in the A & B Buildings	Tier I	$31,780	New handrails for interior ramps and stairs in A building.
	Upgrade fire alarms in the High School Gym	Tier I	$185,571	-
	Exterior ADA Upgrades at the Gym	Tier I	$122,579	-
	ADA Compliant Bathrooms in the Gym	Tier I	$136,199	-
	Interior ADA Upgrades in Gym	Tier I	$37,114	-

Hazardous Materials	Abate Asbestos as Needed for New Work	Tier I	$TBD	To be determined based on scope of final project
Security & Access Control	Implement Continuous Live Monitoring Camera System. Expand Exterior Coverage	Tier II	$65,807	-
	Secure Entry Vestibule for Main Entrance in the A Building	Tier I	$226,998	-
		Total:	$7,152,935	

Notes: [1] Cost Estimates include soft costs such as architectural, engineering, and general contracting fess

Eckhart Elementary School

Component	Recommendation	Priority Tier	Cost Estimate [1]	Comments
Building Structure	Identify & Correct Water Infiltration/Drainage Issue Above Atrium	Tier I	$2,631	-
	Demolish Modular Classrooms	Tier III	$98,971	-
	Re-Pour Sidewalks Around Northwest Corner to Properly Shed Water	Tier III	$11,627	-
Building Envelope	Correct Water Infiltration/Drainage Issue Above Atrium	Tier III	$2,631	-
HVAC	Install Packaged Rooftop Unit to Serve Cafeteria – Downsize Boiler to Serve Kitchen.	Tier I	$77,249	-
	Replace Dilapidated Gymnasium Furnace	Tier I	$40,443	-
	Install a Modern Building Management System	Tier I	$127,891	-
	Repair or Replace Boy's Restroom Exhaust Fan	Tier II	$2,169	-
ADA Life Safety Fire Protection	Building Wide ADA Compliant Bathrooms	Tier II	$79,449	-
	Interior ADA Upgrades	Tier I	$59,020	-
	Exterior ADA Upgrades	Tier II	$110,094	-
	Fire Response System Upgrades	Tier I	$703,695	-
Security & Access Control	Implement Continuous Live Monitoring Camera System - Expand Exterior Coverage	Tier II	$31,469	-
		Total:	$1,347,339	

Notes: [1] Cost Estimates include soft costs such as architectural, engineering, and general contracting fess

Fisher's Peak Elementary School

Component	Recommendation	Priority Tier	Cost Estimate [1]	Comments
Building Envelope	Re-roof Library Section & Improve Drainage	Tier I	$9,077	-
Interiors	Tuckpoint Cracked Mortar on Interior CMU Walls	Tier I	$14,948	-
	Repair Water Damaged Walls & Beams in Library	Tier I	$4,085	Due to the roof leak above the library
	Repair Cracked Slabs & Replace Flooring Building Wide	Tier I	$390,707	-
HVAC	Modern Building Management System	Tier I	$182,498	-
	Replace Packaged Rooftop Air Handlers	Tier III	$273,443	-
	Retrofit Gym Air Handler with Cooling	Tier III	$62,924	-
ADA Life Safety Fire Protection	Exterior ADA Upgrades	Tier I	$142,865	-
	Fire Response System Upgrades	Tier III	$164,844	-
	Building Wide ADA Compliant Bathrooms	Tier III	$4,396	-
	Interior ADA Upgrades	Tier III	$2,198	-
Security & Access Control	Implement Continuous Live Monitoring Camera System. Expand Exterior Coverage	Tier II	$30,470	-
		Total:	$1,282,455	

Notes: [1] Cost Estimates include soft costs such as architectural, engineering, and general contracting fess

Options for Relevant Recommendations

HVAC Renovation – Trinidad Middle School

Life-Cycle Cost Analysis: HVAC System Selection

Three systems – geothermal heat pumps, air source VRF, and four-pipe hydronic – were analyzed quantitatively, accounting for all important factors such as annual maintenance and energy cost, as well as first cost, to provide a solid overall picture of the cost of owning and operating each system. Additionally, qualitative aspects for each system were considered to arrive at a recommendation for which system will best serve Trinidad County School District. More details on HVAC system life cycle cost comparison and the pros and cons of each are outlined below.

Life-Cycle Cost Analysis

Commonly, the decision on the type of heating and cooling system to use in a building is made based on very little or incomplete information, often neglecting initial cost and operation and maintenance costs. All too often are the mechanical systems chosen based solely for the convenience of the Contractor, HVAC equipment sales representative, or mechanical engineer. Conversely, in order to provide you with the most accurate information possible to assist you in making informed decisions related to energy management and the operation of your buildings, a thorough life-cycle cost analysis was performed to compare HVAC system alternatives at the Middle School

This more comprehensive financial model takes into account all important factors such as annual maintenance and energy cost, as well as first cost, to provide a solid overall picture of the cost of owning and operating each system; it provides a means to select the optimal HVAC system type from competing alternatives.

The following new HVAC System alternatives were evaluated weighing their 25-year life-cycle costs and also outlining the qualitative advantages and disadvantages of each. These three HVAC system options are examined below, all of which address the School's current comfort issues:

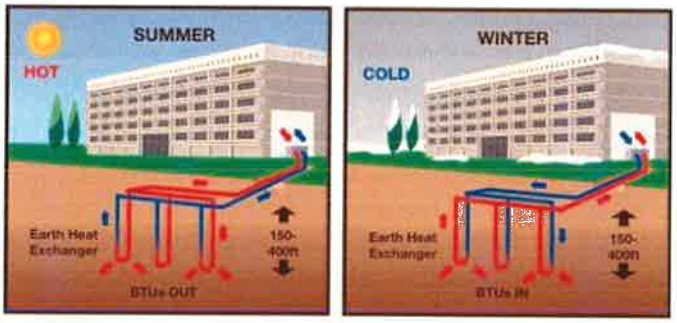
1. Geothermal Heat Pumps
2. 4-Pipe System
3. Air Source VRF

Source of First Costs:
First cost estimates were performed using the R.S. Means Building Construction Cost Database, local labor rates, and actual equipment quotes from vendors' representatives.

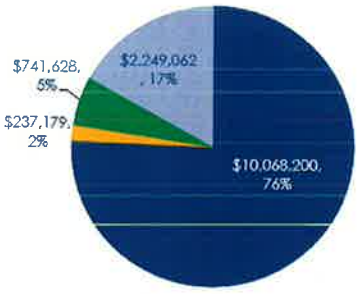
Source of Maintenance Costs:
Maintenance cost estimates are form published estimating guides from R.S. Means, the industry leading construction cost publication.

Option 1: Geothermal Heat Pumps with Dedicated Ventilation

This option involves installing water-source heat pumps in place of the existing equipment. Heat pumps in each zone extract heat from the condenser water loop (heating mode) or reject heat to the loop (cooling mode). Because of its design, the system also allows for the exchange of heat between zones. A zone that requires heating can absorb the heat from a zone that is in the cooling mode rejecting its heat to the central loop. The same condenser water is then routed into a ground loop, in which it will absorb or reject heat from/into the earth. Below five feet, the ground temperature stays fairly constant and is not affected by weather; making the earth an ideal heat source / heat sink.



In the middle school, a new dedicated outside air system (DOAS) will need to be installed along with the heat pumps. Additionally, the gymnasiums, auditorium, and cafeteria will be served by packaged gas/DX rooftop units to reduce the required size of the geothermal well field.



25-Year LCC:	$10,068,200
Typical Life:	30+ years
Indoor Air Quality:	Excellent
Invasiveness:	Good
Serviceability:	Excellent
Aesthetics:	Excellent

Advantages

- Allows for exchanging heat from one zone to another for buildings with large load diversities
- Equipment is simple for service and maintenance containing a straight forward refrigeration system
- Provides environmental control in scattered occupied zones during nights or weekends without the need to start a large central refrigeration machine
- Minimally disruptive installation due to reuse of existing piping
- The system is well-suited to spaces requiring many zones of individual temperature control
- There are no boilers or chillers/condensing units in this system; therefore, the only central plant equipment are the pumps

Disadvantages

- Compressors are distributed, located inside each heat pump, resulting in more points of maintenance
- Routine maintenance within occupied spaces is required to maintain capacity

Photos:

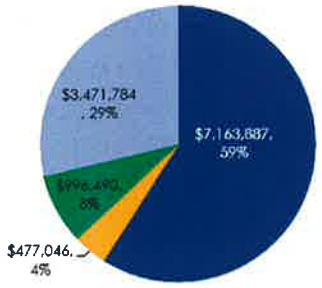
Water source heat pump console unit

Water source heat pump plenum mounted fan coil unit

Option 2: 4-Pipe Hot/Chilled Water System with Dedicated Ventilation

A more conventional solution to replace the aging HVAC system would be a 4-pipe hot water/DX system. This system features a condensing boiler to provide hot water and an air-cooled condensing unit to provide chilled water to the building. All zone level equipment would be replaced with 4-pipe equipment. The gym, which currently has hot water unit heaters, requires a replacement system with ventilation air to meet current codes. A 4-pipe air handling unit would be used to serve this purpose. The existing hot water loop can likely be re-used with the new system to reduce installation costs.

Additionally, a new dedicated outside air system (DOAS) will need to be installed along with the four pipe fancoils.



25-Year LCC:	$7,163,887
Typical Life:	30+ years
Indoor Air Quality:	Excllent
Invasiveness:	Poor
Serviceability:	Good
Aesthetics:	Good

Advantages

- Responds well to fluctuations in space load conditions
- Relatively low heating costs due to the use of condensing boilers
- New fan coil units and unit ventilators use EC fan motors, which are more efficient than older PSC or shaded pole motors
- The existing hot water loop can be reused in parts of the middle school
- A simple design and commonly used technology
- New pumping system will be variable volume, a big step up in efficiency from constant volume

Disadvantages

- Consumes more energy than heat pump systems, particularly in the swing seasons, when heat pump systems frequently use heat recovery from zone to zone
- Involves installation of 4-pipes to every end-use piece of equipment. Water/ground source heat pump systems use only 2-pipes. Uses more pumping energy and more initial expense
- The design is not flexible to accommodate future changes in space use
- Central equipment has a shorter life span than a ground source system

Photos:

Air-cooled condensing unit and condensing boiler.

A 4-pipe unit ventilator

Option 3: Air Source VRF System with Dedicated Ventilation

Variable Refrigerant Flow (VRF) systems first appeared in Japan in 1982 and are now used throughout the world with increasing presence in the U.S. VRF system are large-capacity, sophisticated versions of ductless multisplit air-conditioning or heat pump systems, which include multiple indoor evaporators connected to a single condensing unit containing one or multiple inverter-driven (variable-speed) compressors. VRF systems have the additional capability of connecting ducted style fan coil units. They do not provide ventilation, so a separate ventilation system is typically necessary for outdoor air requirements.

The term variable refrigerant flow refers to the ability of the system to control the amount of refrigerant flowing to each of the evaporators, enabling the use of many evaporators of differing capacities and configurations, individualized comfort control, simultaneous heating and cooling in different zones, and heat recovery from one zone to another.

Each condensing unit uses two or three compressors, including an inverter-driven variable-speed compressor. The inverter driven compressors coupled with efficient indoor unit fan operation results in heating and cooling efficiencies that are comparable to high-efficiency water-cooled systems.

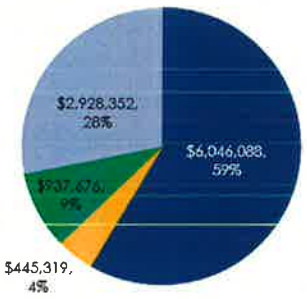
For the middle school, a dedicated ventilation system will be installed along with the VRF equipment. Additionally, the gymnasiums, auditorium, and cafeteria will be served by packaged gas/DX rooftop units to reduce the required size of the condensing units. The cost of the packaged gas/DX rooftop units is not included in the LCC analysis.

Advantages

- **Suitable for retrofitting old** buildings without disturbing the structure.
- Design flexibility allows various size and style indoor units (ceiling recessed, wall-mounted or floor console) to be added to any single outdoor unit, easing adaptation to future expansion or reconfiguration.
- Many zones are possible, each with **precise individual setpoint control**, an advantage of a variable speed compressor.
- **Energy consumption is relatively low** compared to central or ducted systems due to elimination of duct losses and the high part-load efficiency of multiple, variable speed compressors.
- Systems are lightweight and modular and easily transportable compared to larger centralized equipment.
- The indoor units are quiet.

Disadvantages

- Utilized electricity for 100% of space heating needs resulting in sometimes higher winter operating costs than other system equivalents.
- Outdoor condensing units and indoor compressor life is less than for large central equipment, typically 18 to 20 years.



25-Year LCC:	$6,046,088
Typical Life:	18-25+ years
Indoor Air Quality:	Excellent
Invasiveness:	Excellent
Serviceability:	Good
Aesthetics:	Excellent

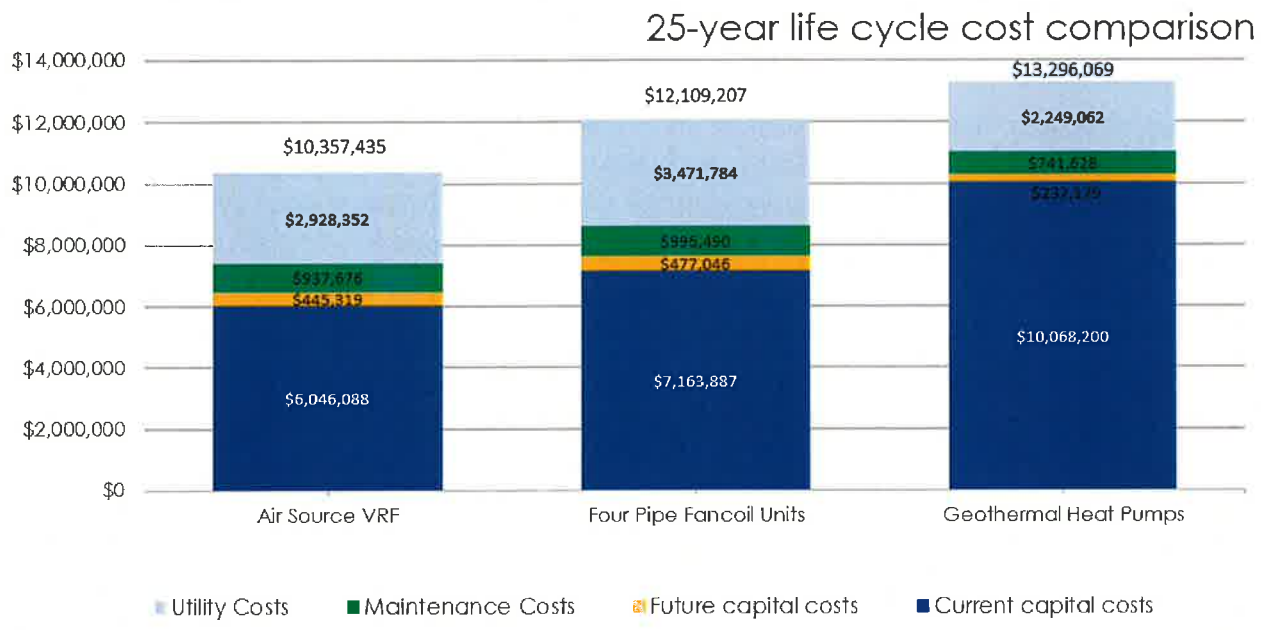
Photos:

A sleek VRF cassette

VRF condensing units.

HVAC System Comparison

On a life cycle cost basis, an air source VRF system is the best choice for the Middle School as shown in the chart below. Unfortunately, each system will incur an energy cost due to the addition of cooling and proper ventilation.



Comparison Table Between Three HVAC System Options:

Option	Description	Cost Estimate [1]	Energy Cost [2]	Pros	Cons
Option 1: Geothermal Heat Pumps	Installation of geothermal heat pump system with dedicated outdoor air to serve the Middle School.	$10,068,200	$41,345	Lowest operating costs. There are no boilers or chillers.	Higher first cost, cooling compressors are distributed.
Option 2: 4-Pipe Hydronic System	Installation of 4-pipe hydronic (boiler & chiller) with dedicated outdoor air in the Middle School.	$7,163,887	$93,587	Longest service life. Does not use distributed compressors.	Consumes more energy than heat pump systems
Option 3: Air Source VRF System	Installation of high efficiency air source VRF to provide the facility with heating and cooling. Included dedicated ventilation.	$6,046,088	$68,977	Lowest first costs and low operating costs – lowest life cycle cost.	Cooling compressors are distributed

Notes: [1] Costs estimates include soft costs such as architectural, engineering, commissioning, energy savings measurement and verification, and general contracting fees.

[2] Adding cooling and adequate ventilation to the building will incur an energy penalty.

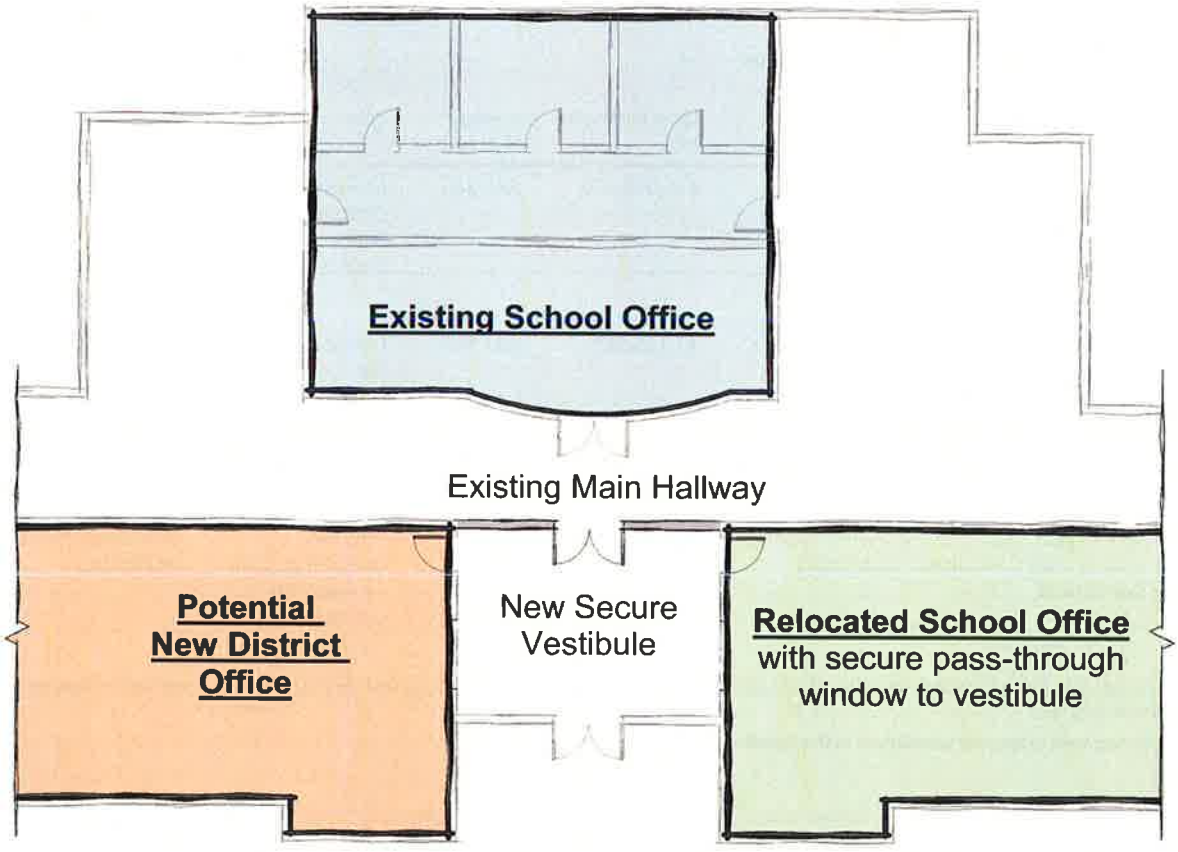
Secured Entry Vestibule – Trinidad Middle School

A secured (enclosed) vestibule will be added to the lower level main entry. The existing exterior wall will remain, and the double entry doors will be replaced and include new secure and accessible door hardware. The secure vestibule will be created by adding a new interior wall with a second set of double (secured) doors to the main hallway. The new vestibule will be provided with a security camera, and a direct, secure pass through window into the school office.

The school office will be relocated from its currently location across the main corridor to the east of the of the main entrance, allowing the direct visual connection to the new vestibule. The new office location would require the relocation of the existing Nurses Station and two classrooms. The Nurse would be moved further to the north to maintain a central location, and proximity to the School Office and main entry.

A staff person in the school office will be able to talk to visitors face to face via the pass-through window, without automatically allowing them access to the school, as is the current situation. The school staff will have the ability to remotely lock/unlock both sets of doors to the secure vestibule, allowing greater control over who enters the building, as well as providing the ability to contain someone within the vestibule if there is a threat.

The district administration offices would relocate to the either the existing school office or west of the secured vestibule. If relocated to the west of the secured vestibule, a secure pass through window, and door could be added from the vestibule for visitors to access the District Office without having to enter the main hallway of the school.



Prioritized Long-Term Project Implementation

Priority Tier I Projects

Facility	Component	Recommendation	Cost Estimate [1]	Comments
Trinidad Middle School	Building Structure	Remediate Below Grade Walls 1911/1922 Construction	$1,315,258	-
	Building Envelope	Tuckpoint Entire 1911 Building	$608,678	-
		Comprehensive Window Replacement	$833,216	-
		Improve Drainage off Auditorium	$7,780	-
	Interiors	Replace Failing Floor Tiles in 1911 Building - Repair Subfloor as Needed	$301,349	-
		Remediate Water Damaged Ceiling Joists in Auditorium - Replace Water Damaged Lights and Ceiling Tile	$32,773	-
	Electrical	Replace Generator & Add Servers to Back-up Circuit	$153,746	-
		Add Additional Outlets in Classrooms	$35,789	-
		Replace Electrical System in 1964 Park St Addition	$230,958	-
	HVAC	Classroom Air Source VRF w/ DOAS & Controls	$5,854,149	-
		High Efficiency Auditorium Rooftop Units w/ Cooling	$134,713	-
		High Efficiency Gym Rooftop Unit w/ Cooling	$116,453	-
		High Efficiency Cafeteria Rooftop Unit w/ Cooling	$98,193	-
		Fix Bathroom/Lab/Janitor Closet Ventilation Fans	$4,282	-
	ADA Life Safety Fire Protection	Comprehensive Replacement of Exit Doors	$132,930	-
		ADA Compliant Bathrooms Building Wide	$339,331	-
		Fire Suppression System for Park St. Building	$739,685	-
		ADA Compliance & Modern Safety Standards	$25,145	Railings around stairwells, code compliant door hardware in Park St, etc.
		Upgrade 1911 Fire Suppression System	$758,283	Extend fire alarm system to 1922 gym and upgrade system to include voice evacuation
		Correct Deficiencies in 1911 Fire Suppression System	$109,896	Repair exhaust system in auditorium, and fix dry valve in the attic.

	Hazardous Materials	Remediate Asbestos as Needed for New Work	$TBD	Final ACM abatement cost depends on the scope of the final project.
	Security & Access Control	Secure Entry Vestibule for Main Entrance	$368,943	-
Trinidad High School	Building Structure	Repair & Correct Drainage or Remove Suspended Sidewalk on East Side of B Building	$49,486	-
	Building Envelope	Replace B Building Roof	$635,072	-
	Interiors	Renovate the Chemistry Lab to Meet Educational Intent	$TBD	Further collaboration needed with district to generate estimate
	Electrical	Expand Electrical Panel Capacity	$15,287	-
		Replace B Building MDP Panel	$40,411	-
	HVAC	Building Management System for A & B Buildings	$186,365	-
		Improve Dust Collection System in the Woodshop	$29,691	-
		Repair and Expand Exhaust Hood System for Lab	$42,608	-
		Install Smaller, Efficient Boilers in the Gym	$794,102	-
		Modern Building Management System in the Gym	$101,345	-
		Install Locker Room Ventilation System in the Gym	$135,528	-
	Plumbing	Install Backflow Preventer	$54,434	-
		Renovate Showers in Gym Locker Rooms	$67,632	-
		Upgrade Fixtures Throughout Building	$27,359	-
	ADA Life Safety Fire Protection	ADA Compliant Bathrooms at the A & B Buildings	$292,479	-
		Upgrade fire alarms in the High School Gym	$185,571	-
		Exterior ADA Upgrades at the Gym	$122,579	-
		ADA Compliant Bathrooms in the Gym	$136,199	-
		Interior ADA Upgrades in Gym	$37,114	-
		Fire Response System Urgent Needs in A & B Buildings	$9,080	New hardware for double doors.
		Interior ADA Upgrades in the A & B Buildings	$31,780	New handrails for interior ramps and stairs in A building.
		Fire Response System Upgrades in A & B Buildings	$1,543,590	Add fire suppression to A and B buildings. Upgraded fire alarms throughout A and B buildings.

	Hazardous Materials	Abate Asbestos as Needed for New Work	$TBD	To be determined based on scope of final project
	Security & Access Control	Secure Entry Vestibule for Main Entrance in the A Building	$226,998	-
Fisher's Peak Elementary School	Building Envelope	Re-roof Library Section & Improve Drainage	$9,077	-
	Interiors	Tuckpoint Cracked Mortar on Interior CMU Walls	$14,948	
		Repair Water Damaged Walls & Beams in Library	$4,085	Due to the roof leak above the library
		Repair Cracked Slabs & Replace Flooring Building Wide	$390,707	
	HVAC	Modern Building Management System	$182,498	-
	ADA Life Safety Fire Protection	Exterior ADA Upgrades	$142,865	-
Eckhart Elementary School	Building Structure	Identify & Correct Water Infiltration/Drainage Issue Above Atrium	$2,631	-
	HVAC	Install Packaged Rooftop Unit to Serve Cafeteria – Downsize Boiler to Serve Kitchen.	$77,249	-
		Replace Dilapidated Gymnasium Furnace	$40,443	-
		Install a Modern Building Management System	$127,891	-
	ADA Life Safety Fire Protection	Interior ADA Upgrades	$59,020	-
		Fire Response System Upgrades	$703,695	-
			$18,721,369	

Priority Tier II Projects: 2-5 Years

Facility	Component	Recommendation	Cost Estimate [1]	Comments
Trinidad Middle School	Interiors	Remediate Water Damaged Ceiling Joists in Auditorium - Replace Water Damaged Lights and Ceiling Tile	$32,773	
	Electrical	Building Wide LED Retrofits	$352,729	
	Plumbing	Upgrade fixtures throughout building	$64,372	
	ADA Accessibility Life Safety Fire Protection	Dedicated bathroom for Nurse's Office	$52,223	
		ADA compliant sidewalks outside 1922 gym	$22,041	
		ADA Access Ramp for Park St. Basement Rooms	$9,616	
	Security & Access Control	Implement Continuous Live Monitoring Camera System. Expand Exterior Coverage	$55,610	
Trinidad High School	Electrical	LED Lighting Retrofit	$114,807	
	HVAC	Install Packaged Rooftop Units to Serve B Building Classrooms - Decommission Boiler.	$1,011,871	
	ADA Accessibility Life Safety Fire Protection	Exterior ADA Upgrades at the A & B Buildings	$183,869	New ramps to the B building upper and lower levels. New ramp between A building and the gym. Code compliant handrails around stairs.
	Security & Access Control	Implement Continuous Live Monitoring Camera System. Expand Exterior Coverage	$65,807	
Fisher's Peak Elementary School	Security & Access Control	Implement Continuous Live Monitoring Camera System. Expand Exterior Coverage	$30,470	
Eckhart Elementary School	HVAC	Repair or Replace Boy's Restroom Exhaust Fan	$2,169	
	ADA Accessibility Life Safety Fire Protection	Building Wide ADA Compliant Bathrooms	$79,449	
		Exterior ADA Upgrades	$110,094	
	Security & Access Control	Implement Continuous Live Monitoring Camera System - Expand Exterior Coverage	$31,469	
			$2,219,369	

Priority Tier III Projects: 5-10 Years

Facility	Component	Recommendation	Cost Estimate [1]	Comments
Fisher's Peak Elementary School	HVAC	Replace Packaged Rooftop Air Handlers	$273,443	
		Retrofit Gym Air Handler with Cooling	$62,924	
	ADA Accessibility Life Safety Fire Protection	Fire Response System Upgrades	$164,844	
		Building Wide ADA Compliant Bathrooms	$4,396	
		Interior ADA Upgrades	$2,198	
Eckhart Elementary School	Building Structure	Demolish Modular Classrooms	$98,971	
		Re-Pour Sidewalks Around Northwest Corner to Properly Shed Water	$11,627	
	Building Envelope	Identify % Correct Water Infiltration/Drainage Issue Above Atrium	$2,631	

Cost & Savings Estimate Detail

The district was aided by collective team of professionals to develop the Facility Maintenance Master Plan and cost estimates for the Detailed Project Budget. This group included an architect (AIA, LEED AP BD+C), a structural engineer (P.E), two mechanical engineers (P.E), an electrical engineer (P.E.), and a Senior Construction Manager, all of which are professionally licensed in Colorado and have combined decades of experience with similar project development and execution. Moreover, the architect and structural engineer on our team have focused their careers on historic preservation, adding addition confidence and qualifications to our team.

Generally, estimates were derived from RS Means construction cost database and historical cost data from previous projects. Quantities were derived for each task from dimension floor plans, scaled floor plans, field measurements from multiple site visits, and extensive feedback from key district staff.

These estimates are comprehensive, including all anticipated costs to complete the work from planning and design through construction and post construction services. Line items for each major scope of work were estimated by contractors specific to those trades. This included validation of mechanical, electrical, windows, masonry, and structural. Less substantial scope items have been estimated by the architect, engineers and construction manager who were involved in the Master Plan development. These include: ceilings, mitigation, and related general construction items (site work, woodwork, necessary roof patchwork, structural, and finishes).

Given the rising construction demands in the Colorado market, anticipated cost escalations were factored into the estimate given that select work be performed over summer of 2019, and major components not until the summer of 2020. Appropriate construction contingency was added due to the scope being conceptual and not based on final construction documents. Owner's contingency was included for anticipating minor changes in scope. Design costs were estimated per construction division, and costs for bonds, insurance and general contractor fees we accounted for.

In summary, the Detailed Project Budget provided in this application was derived from a team of experienced companies who specialize in preservation-centric architectural design and renovation experience, engineering design across multiple disciplines, and construction services personnel who understand the construction landscape in the State of Colorado.

Funding

This district anticipates pursuit of a Mill Levy Override in the approximate amount of ten (10) mills. At present, this district is nearing the conclusion of a current bond issue initially undertaken in 2000 and subsequently refunded in 2010. The current bond issue will be paid off in 2020.

A Mill Levy Override will generate sufficient funds for this district to satisfy its local match and some additional funds to be committed to its capital improvements funds to address other improvements needed but not included in its BEST grant application.

Capital Renewal

Should this district be awarded this grant the above-described maintenance program would be expanded and enhanced incorporating manufacturers' recommendations for proper service and maintenance. Additional funding would be added to annual appropriations for such maintenance and upkeep as well as a determination of the need for supplemental staff support.

Funding would also be increased to offset costs of any additional utility expenses. In circumstances where proper maintenance requires the engagement of outside professional service support, i.e. licensed electricians. Depending on the work that will be accomplished, some outside contract work may need to be budgeted as well for proper warranty coverage and operation such as a new generator emergency power system.

The proper logging of annual maintenance needs to occur and carried out annually. The proper daily, weekly, and monthly inspections will need to be crucial for proper proactive maintenance procedures. If these steps are taken by the district, we will be able to sustain the life of our investment for years to come.

XV. Conclusion

Trinidad School District Board of Education

Paul Montera – President

Paul Montera is the husband of former TSD1 Board member Karen Montera, they have three grown children, all graduates of Trinidad High School and Trinidad State Junior College. Paul is a graduate of TSJC and Colorado State University, where he earned both his Bachelor of Education and Master of Education degrees.

He was a teacher and administrator at Trinidad State Junior College for over 34 years, retiring in 2005.

He is a member of the Knights of Columbus, the president of the Trinidad Area School and Public Employees Retirement Association and the President of the Trinidad School District #1 Board of Education.

Patrick Sandoval – Vice President

I am married to DaLonna and between the two of us we have 9 children, having five of them attend local schools and graduating from Trinidad High School.

I have lived in Trinidad, Colorado since shortly after my birth in Santa Fe, New Mexico. I attended local schools and graduated from Trinidad High in 1968 and then graduated from TSJC in 1970 and then furthered my education by attending the University of Northern Colorado in Greeley. I was then hired as a Trainman on the Colorado and Southern Railroad. I retired in 2001 with 30 years of service.

I ran for the school board to put students first and insure that their education and safety is of utmost importance. The board must be fiscally responsible and use those monies with utmost care in providing what is best for our students and community. The board must listen to the concerns of the students, teachers, administrators and the community in making decisions. The board must respect all employees and appreciate all that they do for the district.

By doing what is best for the district we can hope to regain the cooperation and respect that this community deserves.

Debora Hartman – Board Member

I am Deb Hartman and I have been a resident of Trinidad the past 26 years and I have two grown children that attended Trinidad Schools. I am a graduate of Trinidad State Jr. College majoring in Early Childhood Education and have worked for South Central Council of Governments since 1998 creating the children's programs at the SCCOG Early Learning Center. The Early Learning Center is "Quality Rated" in the state of Colorado at a "4 star rating".

I am very active at Holy Trinidad Church, the Department of Human Services-Child Protection Team, Kiwanis, the Trinidad High School Vocational Department Advisory Council, the Huerfano/Las Animas County Early Childhood Council and the Colorado Preschool Program Advisory Council as well as the instructor for the Colorado Department of Education/Colorado Department of Human Services Expanding Quality in Infant Toddler Care.

I am thrilled to have the honor to serve on the Trinidad School District #1 Board of Education and I look forward to making a difference in our community's children and families lives. Together we can supply children with equal opportunities regardless of learning styles and offer community support. Together let's make Trinidad a place where people want to come and be excited about educating their children.

Joe Terry – Secretary

Mr. Terry was born and raised in Sopris, Colorado. He graduated from Lincoln High School, Adams State College and has a Master's Degree in special Education from Denver University. He has taught elementary school and special education in Colorado Springs and started the first Secondary Education Program at Trinidad High School.

Mr. Terry is a retired Farmers Insurance agent and is the owner of Teri's Hallmark and Floral Store in historic downtown Trinidad. He is active in many community activities including being a former member of City Council, Down Town Merchants, and member of the Holy Trinity Catholic Church.

Joe and his wife Louise have two children, Joe and Regina and two granddaughters Natalia and Marli. His hobbies include constructing and making custom made knives, and gardening.

Dan Ruscetti – Board Member

Not Pictured.

FMMP & BEST Committee

- Paul Montera – Board President
- Dan Ruscetti – Board Member
- Jeff Roybal – Director of Facilities
- William Cordova – Business Manager, Acting Administrator
- Weston Gouger – 360 Energy Engineers
- Colton Heaps, P.E. – 360 Energy Engineers
- Rebecca Silva, Rebecca Silva, AIA, LEED AP BD+C - Anderson Hallas Architects, PC

Additional Development Support

- Lawrence M. Graham, P.E. JVA Consulting Engineers

360 Energy Engineers Company Overview

360 Energy Engineers is part of the Willdan Group, Inc., which has over 50 years of nationwide experience in providing innovative engineering and financial solutions to address rapidly changing energy, water, infrastructure, and security needs.

Core Values

We at 360 Energy Engineers believe that our in-house professional engineers bring value to our clients' facility improvement projects. In our previous engineering positions, we knew that we could improve project delivery and we built our company out of a desire to do things more efficiently and cost effectively in order to bring more accountability, greater reliability, and better performance to those we set out to serve. As a full-service mechanical, electrical, and plumbing (MEP) engineering firm, these core values make us uniquely qualified to develop, implement, and commission reliable, long-term infrastructure solutions of any size or scope. Each of these core values is described in more detail below to illustrate how we at 360 Energy Engineers strive to bring our clients the new benchmark in project delivery.

360 Energy Engineers is committed first and foremost to helping our clients address their core infrastructure needs. Unlike many of our competitors who seek exclusively 'low-hanging' energy-savings projects or product promotion, we want to provide comprehensive solutions that will address the core of our client's needs. As a vendor-independent engineering firm, we specialize in solutions that not only improve our clients' building system reliability and performance, but also significantly lower their operating costs through major system redesign, project implementation, commissioning, and post construction support and optimization.

Listening to and understanding our clients' goals and objectives is paramount in our efforts to create innovative, cost-effective solutions. It is only after we fully understand our clients' needs that we can evaluate the full range of options and recommend solutions that best align with our clients' facility and budget goals. Unparalleled client satisfaction, a hallmark of our success, is the result of projects consistently defined by client focused engineering, a lower life-cycle cost, and guaranteed performance.

360 Energy Engineers was founded to revolutionize project delivery, specifically performance contracting, by focusing on the lowest long-term cost and a better project outcome for our clients. Our engineering–centric approach combines the best aspects of traditional conduction methodology to provide turnkey solutions. We offer single-source accountability, vendor independence, 100% engineering design, rigorous system commissioning, and a real performance guarantee.

Our team leaves nothing to chance when it comes to the planning, design, and implementation that we do for our clients. Because we do enhanced energy modeling and life-cycle cost analysis, our clients can make informed decisions about the optimal long-term solutions for their facilities. Most importantly, traditional 100% engineering design provides the basis for competitive pricing, resulting in the lowest project cost and eliminating client risk with a guaranteed fixed cost price.

ANDERSON HALLAS ARCHITECTS

Anderson Hallas Architects, PC Company Overview

Rebecca Silva, Rebecca Silva, AIA, LEED AP BD+C

Rebecca has over 12 years' experience in the fields of Architecture and Landscape Architecture. Within the past year, she has managed space planning efforts for Huerfano County, Custer County, the City of Westminster, and the Town of Superior. Rebecca is detail-oriented and excels in project coordination and document development. Rebecca is active in USGBC Colorado, Women in Design Denver, and Habitat for Humanity. She is also currently serving on the City of Lakewood Historic Preservation Commission.

License: Colorado # 403701

Education:

- Master of Landscape Architecture and Master of Architecture
- University of Colorado, Denver
- Bachelor of Architecture, Philadelphia University

Professional Affiliations, Service:

- American Institute of Architects
- Women in Design
- Habitat for Humanity
- U.S. Green Building Council
- City of Lakewood Historic Preservation Commission
- "Experts Discuss the Value of Environmentally Friendly Building Practices." Published in Central Penn Business Journal, Sept 2007
- Honorable Mention: USGBC Sustainable Design Competition, May 2005

Key Project Experience:

- BVSD Eisenhower Elementary School, remodel, Boulder, CO
- DPS Strive Kepner, remodel and systems upgrades, Denver, CO
- ELK Education Center and Open Space Park, programming and design, Montbello, CO
- Huerfano County Judicial Center, space planning and programming, Walsenburg, CO
- NPS Rim Visitor and Education Center, PD/SD, Crater Lake NP, OR
- NPS Eielson Visitor Center, roof replacement design, Denali NP, AK
- NPS Rehabilitate Three Restrooms, Mesa Verde National Park, CO
- Boyd Lake State Park, redevelopment master plan, CO
- Eleven Mile State Park, redevelopment master plan, CO
- Custer County Courthouse, space needs assessment, Westcliffe, CO
- Inspiration Playground, restroom addition, Bellevue, WA
- GSA Building 67, consolidation study, Lakewood, CO
- GSA DOC-OIG, tenant finish, Lakewood, CO

- GSA Department of Commerce, tenant finish, Byron Rodgers Federal Office Building, Denver, CO
- New Judicial Center and Sheriff / Detention Facility, analysis, programming and planning for a Lake County, Leadville, CO
- Red Rocks First Aid & Security Station, tenant finish, Red Rocks, CO
- Superior Town Hall, PD/SD for addition and expansion, Superior, CO
- Westminster City Hall, Courthouse and Municipal Services Complex, space utilization and needs assessment, Westminster, COFirm Culture

Firm Culture

For the past 27 years, we have built our practice providing full architectural services to public agency clients like Jefferson County Public Schools, Denver Public Schools, the State of Colorado and the National Park Service. These agencies have entrusted us to solve issues for them both in the immediate scope of work and over the long-term.

With each project, Anderson Hallas commits to designing functional, attractive spaces, while engaging the team in a forward-thinking mindset to ensure that exceptional spaces and building systems are well-integrated and will function efficiently for many years. We have repeatedly demonstrated an ability to navigate tight budgets and schedules, and a commitment to implementing sustainable improvements.

We are problem-solvers with diverse experience throughout the West and a deep knowledge of the built environment in a variety of climatic regions. Experience ranges from contemporary new construction on the front range, to the adaptive reuse of an historic brick school in Summit County, to the rehabilitation of a massive log and stone historic hotel in the remote Montana wilderness.

This experience has molded us into creative designers and technical leaders who are flexible and quick to think on our feet.

Educational Facilities

Much of our recent school work has been rehabilitative, with project goals requiring that aging facilities be updated to provide 21st century learning environments.

Challenges presented by these projects often include minimal ceiling heights, non-compliant circulation at restrooms and/or at connections to various building additions and unsecure entries. With a focus on improved accessibility, thermal comfort for the users of the building, updated tech-nology including A/V, and increased lighting efficiencies, we have been able to achieve seamlessly-integrated, innovative results for our clients.

Firm-Wide Commitment to Sustainability

Anderson Hallas has applied sustainable design strategies such as daylighting, integrated MEP systems design and the use of recycled and/or recyclable building products to our clients's projects for 27 years. Each project is approached from a holistic, sustainable viewpoint; integrating the design with the environment, while paying attention to life cycle cost analysis. One of the primary tactics used to achieve this goal is to "right-size" systems for buildings to reduce expenses, maintenance needs and utility costs.

Our commitment to sustainability led us to enrolling a higher percentage of our firm's technical staff (77%) in the AIA's 2030 Challenge than any other medium to large-sized firm in the state. (The 2030 Challenge is both a goal - that all new buildings be designed to net zero energy standards by 2030 - and a series of courses that better prepare us to advise our clients in its pursuit.)

Larry M. Graham, P.E. - JVA Consulting Engineers

Lawrence Graham is Senior Project Manager at JVA and is an integral member of the company's historic preservation team. He has over 25 years of experience with a specialization in the investigation and repair of historic structures and masonry facades. He spent 2014 consulting in Christchurch, New Zealand where he investigated and prepared repair recommendations for contemporary and historic buildings damaged in the 2011 earthquakes.

While at other firms, he consulted on many prominent local buildings including Denver's Union Station, Centennial Hall at Johnson and Wales University, the Hotel Monaco, Coors' Brewery 1934 Brewhouse, Gart's Sports Castle, the Tivoli, and the Brown Palace Hotel. Larry's early career includes award winning structural design projects. Since joining JVA, Larry investigated and developed an emergency repair design for the 750-foot elevator at Carlsbad Caverns National Park and he has completed several historic structure assessments for the Colorado State Historical Fund and the National Park Service.

Larry is a member and Past President of the Association for Preservation Technology's Rocky Mountain Chapter.

JVA Firm Profile

JVA, Incorporated is a consulting engineering firm headquartered in Boulder, Colorado with offices in Fort Collins, Winter Park, Denver and Glenwood Springs. Since 1956, JVA has provided structural engineering services to architects and owners throughout the Rocky Mountain region and nationwide. Our Civil Engineering department offers site design and environmental services that complement our structural experience.

Our structural expertise encompasses residential, institutional, and commercial building design. JVA's capable staff includes LEED Accredited Professionals committed to sustainable design practices. With professional registration in all 50 states, we have a working knowledge of both national and local building codes. JVA is proud of our contribution to historic projects recognized by local and national preservation organizations.

With a reputation for sound judgment and quality documentation, our staff combines excellent technical skills with effective communication to facilitate the team approach on each project. Creative thinking, design sensitivity, and cost-efficient engineering lead to innovative, yet practical, solutions that fit within the Secretary of the Interior's Standards for the Treatment of Historic Properties, architectural parameters, and project specific constraints.

JVA has a strong background in preservation and renovation work on historic buildings. Our historic preservation work started in the early 1970's with the stabilization, renovation, and preservation of the Chautauqua Auditorium and Dining Hall structures in Boulder, Colorado. Since that time, JVA's preservation work has included Building Engineering Reports, Historic Structure Assessments, and Construction Documents for several hundred building projects in the Rocky Mountain Region and nationwide. We also helped to preserve two of Colorado's Endangered Places in the Dearfield Townsite and the Thomasville Lime Kilns. JVA is continuing design work on the phased stabilization of the Paris Mill, named an Endangered Place in 2004. JVA was the structural engineer on the Bromley Farm / Koizuma Hishinuma Farm Rehabilitation project that was recognized at the 2018 Steven Hart Awards during Colorado Preservation Inc.'s annual conference.

Our Boulder office has a dedicated studio of engineers specializing in Historic Preservation. JVA is also conversant with the Colorado State Historic Fund's requirements for grant funding and the appropriate treatment of historic

properties. Memberships in Colorado Preservation, Inc., the Colorado Historical Society, The National Trust for Historic Preservation, and the Association for Preservation Technology, Inc. help the firm keep updated with important historic preservation issues.

Our investigative expertise is complemented by the use of specialized non-destructive evaluation tools, such as a borescope, cover meter, and resitograph, that minimize our impact on historic fabric. Moisture meters, , ultrasonic thickness gage, laser levels, theodolites, crack monitors, and an extensive collection of hand tools round out our investigative tools. JVA also performs wood species identification in-house.