

# Marshall County Courthouse Facility Assessment

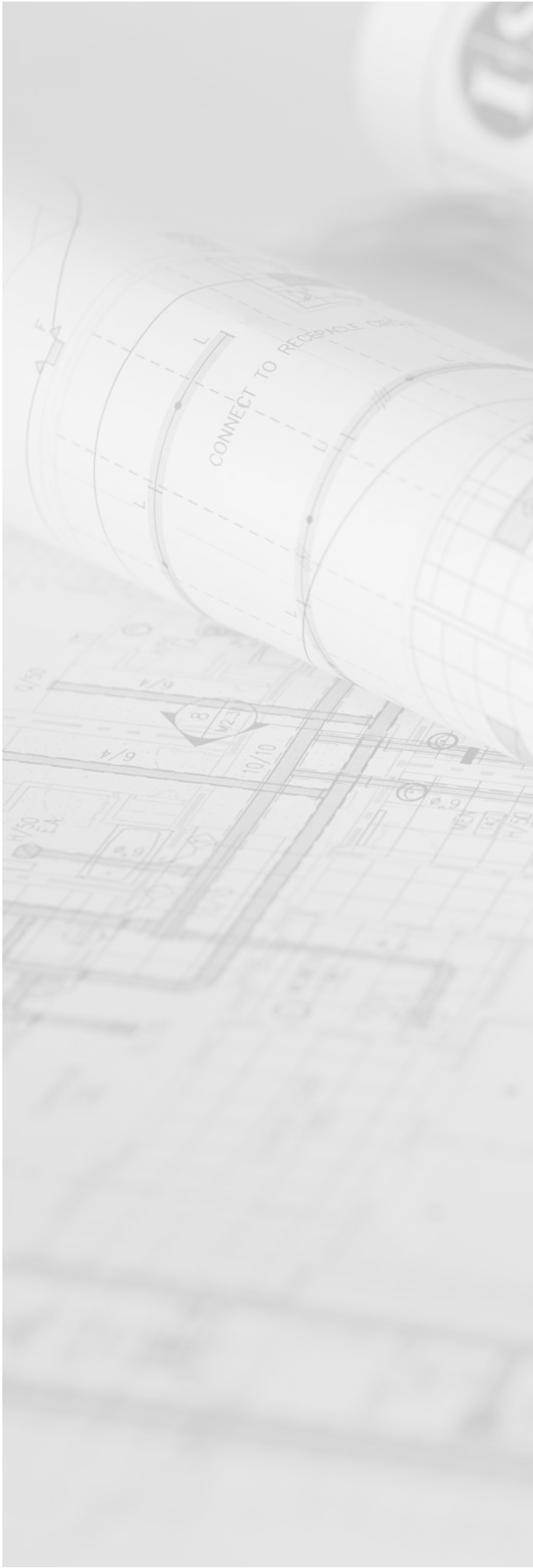
November 6, 2020

**REPORT  
PREPARED FOR:**

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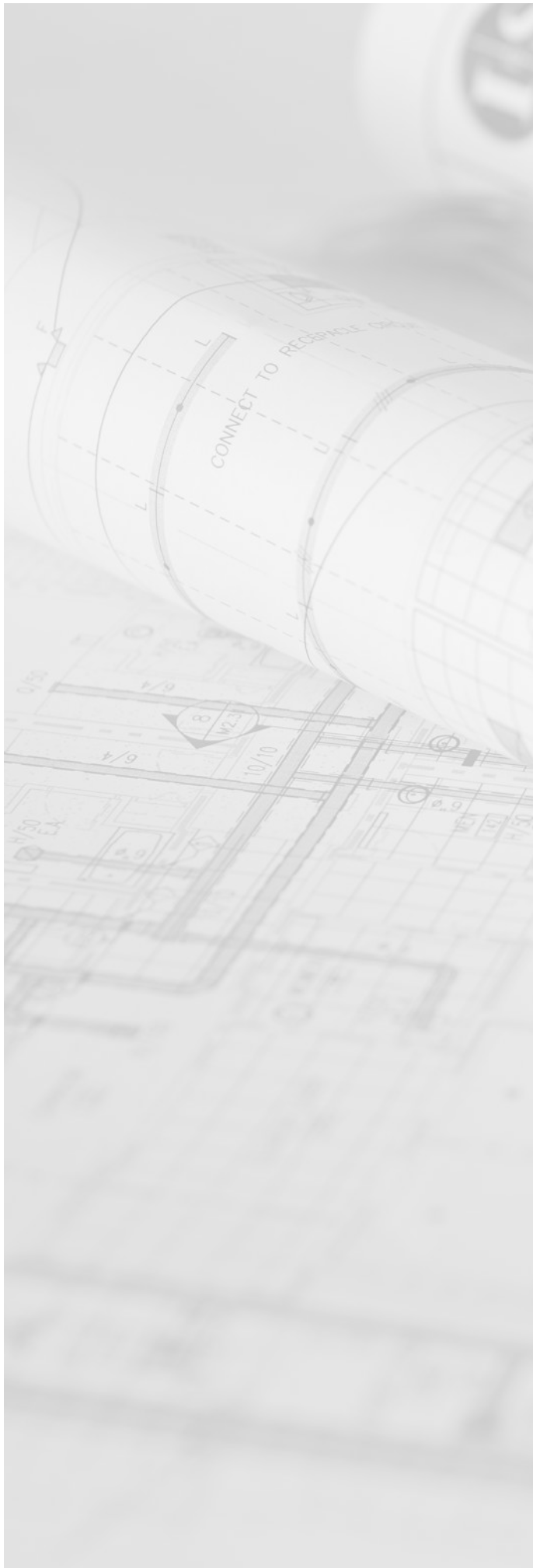
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# Executive Summary

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# Process Overview

Marshall County has seized an opportunity to ensure continued success for community members and staff by requesting a facility assessment of the Marshall County Courthouse. ISG is pleased to have assisted Marshall County by providing a detailed and forward-looking facility plan that properly quantifies, prioritizes, and empowers future decisions. By providing a road map that aligns with Marshall County's needs and goals, the intent of the report is to serve as an integral tool for decision-making in the next decade.

## Purpose Statement

The purpose of this assessment is multi-faceted and is intended to assist Marshall County with the following:

- Planning for maintenance and improvements of the Courthouse
- Informing the tax payers and staff of facilities needs
- Prioritizing long- and short-term projects
- Identifying opportunities to enhance the community user and staff experience
- Finding opportunities to further streamline connectivity with the community

## SCOPE OF EVALUATION

### Facility Assessment

ISG visited the Courthouse facility to perform a comprehensive site and facility evaluation. Assessment review included the following conditions: site, exterior and interior architecture, structural, plumbing, mechanical, electrical, life safety, and accessibility.

During the assessment process, ISG was given access to all areas of the facility, as well as relevant information about the building and associated infrastructure. All observations were limited to non-intrusive, non-destructive visual inspections only. ISG referenced Building Owner and Managers Association (BOMA) life cycle replacement recommendations, along with an evaluation of existing conditions and professional expertise to determine assessment recommendations.

The following pages outline the findings of the assessment. A summary spreadsheet of findings is located within the report, and a full spreadsheet of findings is located in the Appendix. Applicable items were flagged with an ADA or life safety label as appropriate.

## GENERAL MAINTENANCE + REPLACEMENT PLANS

While Marshall County actively addresses facility needs, ISG recommends that Marshall County develop, fund, and implement a maintenance and operations plan for all facilities to manage all building systems.

Replacement plans for all major components should also be documented. Implementing a facilities maintenance and operations plan, as well as replacement plans, is the best way to be proactive and prevent facilities costs from accumulating over time. Maintenance and operations plans usually include routine cleaning, maintenance, and other related services, while replacement plans are generally longer term and include capital planning expenditures.

## RECOMMENDATION CATEGORIES

ISG has included a label to flag any items that address accessibility and/or life safety issues as these are considered priority items.

### ADA

### LIFE SAFETY

The following assessment considers information gathered from field observations, reviews of existing plans, and information provided by facility staff and personnel. The assessment performed on site was limited to non-destructive visual reviews of existing systems. Available information and plans were provided to ISG by Marshall County for review. The following categories were reviewed within the scope of this assessment:



#### Site + Civil

Review of existing building site, including parking spaces, concrete walks, and other horizontal site elements. Site circulation, grading, paving, parking, and stormwater management were also reviewed.



#### Exterior Building

Review of each building's exterior shells, including an assessment of the structure, foundation, exterior walls, windows and doors, and thermal efficiency, as well as conditions of existing roofs, gutters, and downspouts.



#### Structural System

Review of structural integrity of existing buildings with analysis of columns, walls, and roof.



#### Interior Building

Examination of finishes, equipment, and other conditions found in classrooms, offices, hallways, stairwells, kitchen, and lounge areas.



#### Plumbing

Review of existing building plumbing systems, including water service, piping, and supply, as well as plumbing fixtures, including drinking fountains, sinks, toilets, and showers (if applicable).



#### Mechanical

Review of existing mechanical systems and their components, including verification that HVAC systems meet current building codes.



#### Electrical

Review of existing building electrical systems, including electrical service, distribution, and lighting.



#### Technology

Review of existing space allocation and conditions for IT equipment.



#### Security

Assessment of existing security equipment installed throughout the building. Review of existing primary entryways into the facilities, including door locations and visitor access.



#### Life Safety

Review of life safety, egress, and potential code deficiencies as discovered during field observation. This also includes conditions of the fire alarm system.



#### Hazardous Material

Identification of potential hazardous material noted during visual field observations.



#### Accessibility

Review of existing structure for conformance with the Americans with Disabilities Act (ADA). Site parking, access into the building and entrances, accessibility routes inside of building, and restroom accessibility were considered.



## PRIORITY SUMMARY

Based on the items evaluated, any issues or deficiencies documented have been assigned a priority level based on the chart below and an estimate for costs.

PRIORITY	ISSUE	DESCRIPTION
<b>1</b> IMMEDIATE	Accessibility	Items that must be completed to allow access to the building or primary function areas within the building.
	Life Safety	As typically noted by fire marshal or building code officials.
	Health	Areas that do not meet the state health code requirements. Mechanical systems that do not currently comply with ASHRAE standards are given a high priority. However, these upgrades are not mandated and would not be required unless other substantial work is being done to the facility and systems in question.
	Hazardous Materials	Items that pose a significant impact to building occupants.
	Deterioration	Further deterioration will create higher future repair costs or may cause damage to other equipment, systems, or components.
	Time Frame	Budget for next one to three years out.
<b>2</b> EMERGING	Accessibility	Modifications required to meet state guidelines.
	Health	Inadequate exhaust and ventilation.
	Hazardous Materials	Removal of items affected by other changes occurring in Priority 2.
	Deterioration	Material or system that currently functions but will require replacement or major maintenance within five years.
	Energy	Item results in payback within 10 years or less.
	Time Frame	Budget for next four to six years out.
<b>3</b> FUTURE	Accessibility	Modifications required to meet state guidelines.
	Health	Items that do not meet state health code requirements.
	Hazardous Materials	Removal of item affected by other changes occurring in Priority 3.
	Deterioration	Material or system currently functions but will require replacement or major maintenance.
	Energy	Item results in payback in more than 10 years.
	Time Frame	Budget for next seven to 10 years out.

# Executive Summary

## MARSHALL COUNTY DEMOGRAPHIC OVERVIEW

### KEY FACTS

5,205

Population

44.7

Median Age

2,070

Total Households

0.81%

2020-2025 Population  
Annual Growth Rate

\$60,228

Median  
Household Income

### FAMILY GROWTH STATISTICS

2.82

2020 Average  
Family Size

3,614

2020 Family  
Population

1,283

2020 Total  
Family Households

2.81

2025 Average  
Family Size

3,752

2025 Family  
Population

1,333

2025 Total  
Family Households

## POPULATION GROWTH

286

2020 Total Population  
Ages 0-4

282

2020 Total Population  
Ages 5-9

302

2020 Total Population  
Ages 10-14

299

2025 Total Population  
Ages 0-4

290

2025 Total Population  
Ages 5-9

322

2025 Total Population  
Ages 10-14

364

2020 Total Population  
Ages 25-29

355

2020 Total Population  
Ages 30-34

287

2020 Total Population  
Ages 35-39

215

2025 Total Population  
Ages 25-29

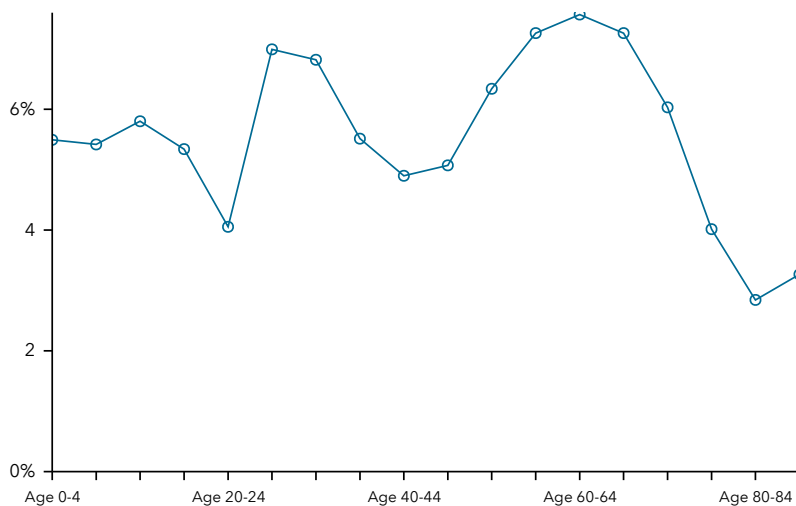
356

2025 Total Population  
Ages 30-34

367

2025 Total Population  
Ages 35-39

## AGE PYRAMID

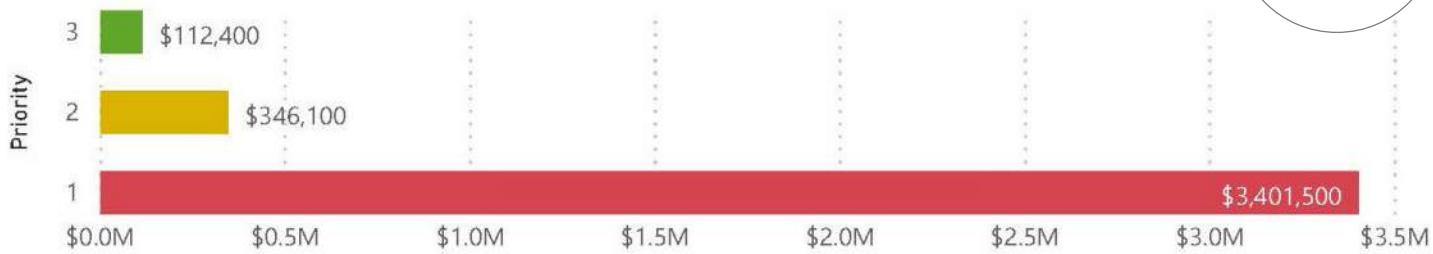


SUMMARY OF FINDINGS

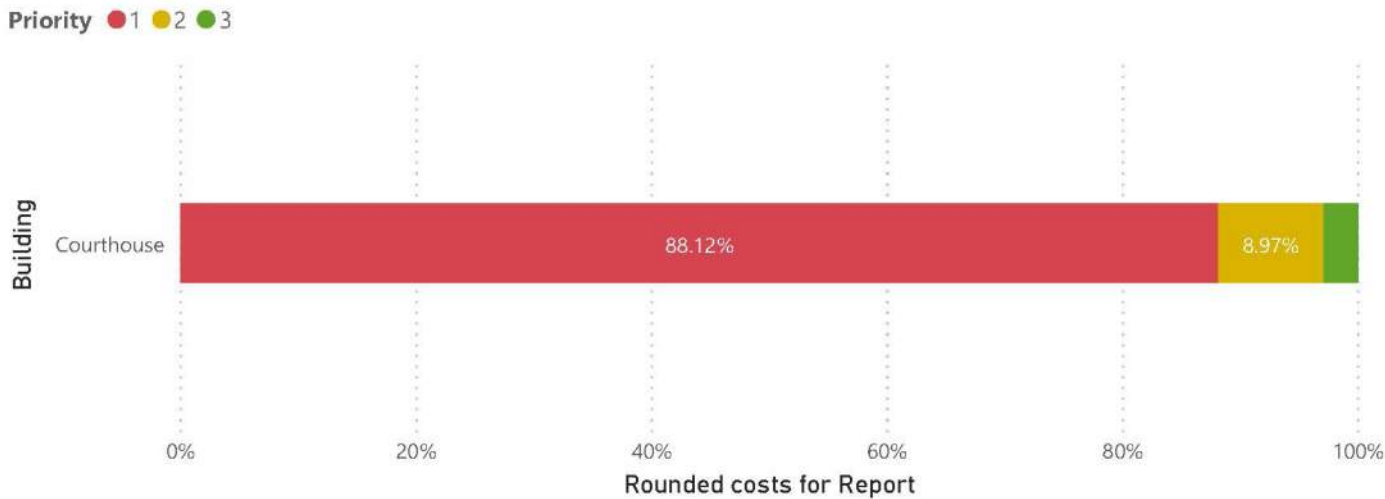
Marshall County Courthouse

**\$3,860,000**  
Estimated  
Cost

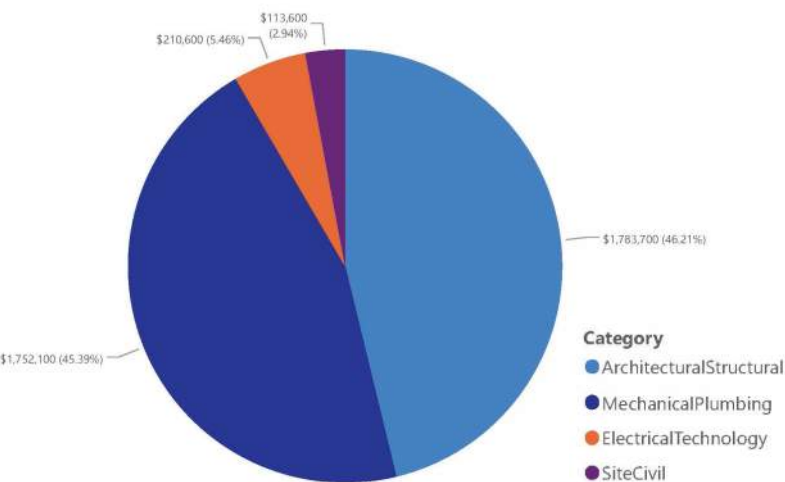
ROUNDED COSTS BY PRIORITY



PERCENTAGE OF ESTIMATED COST BY PRIORITY

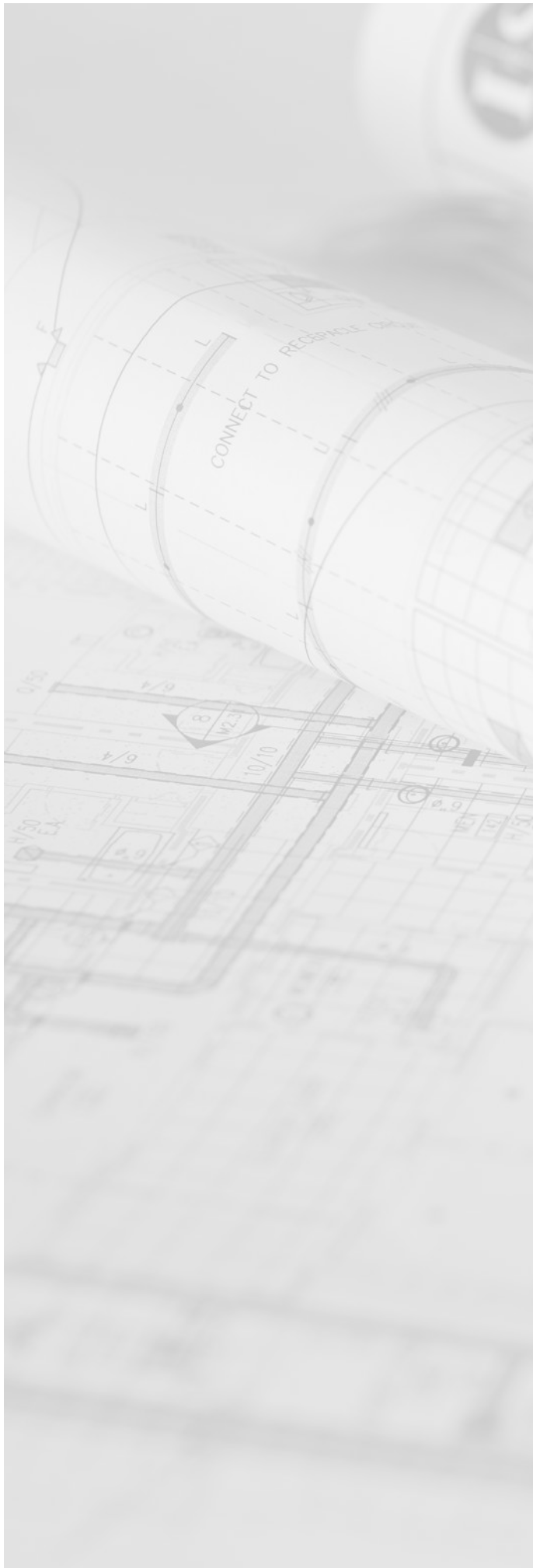


ESTIMATED COST BY CATEGORY



What do these charts mean?

These charts provide a high level snapshot of the financial and priority recommendations for the Marshall County Courthouse. In the sections that follow, costs and priorities are further broken down with detailed photos, descriptions, and estimates. Together, these tools will be useful in making planning decisions for years to come!



# Facility Assessment

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# Marshall County Courthouse

## INTRODUCTION

### OVERVIEW

#### Address

911 Vander Horck, PO Box 130, Britton, South Dakota 57430

#### Building Area

17,500 Total Square Feet; Basement = 4,000 SF (est.)

First Floor – Third Floor = 4,300 SF each; Top Floor = 600 SF (approx.)

### SITE

The Courthouse site is approximately 330' x 330' and is located directly off of Highway 10/27 which is the main route into and through town.

Located west of downtown Britton, near the town center, the Marshall County Courthouse is a three-story facility that houses the county governmental services, including the jail. The building itself is listed on the National Register of Historic Places due to its architectural and engineering significance which is classified as Late Victorian: Second Renaissance Revival.

### ADDITIONS

An accessible entry vestibule was added to the south entrance.

### PREVIOUS + CURRENT USES

The facility is home to County governmental departments including: county auditor, treasurer, planning and zoning, department of equalization, court system, register of deeds, and county jail.



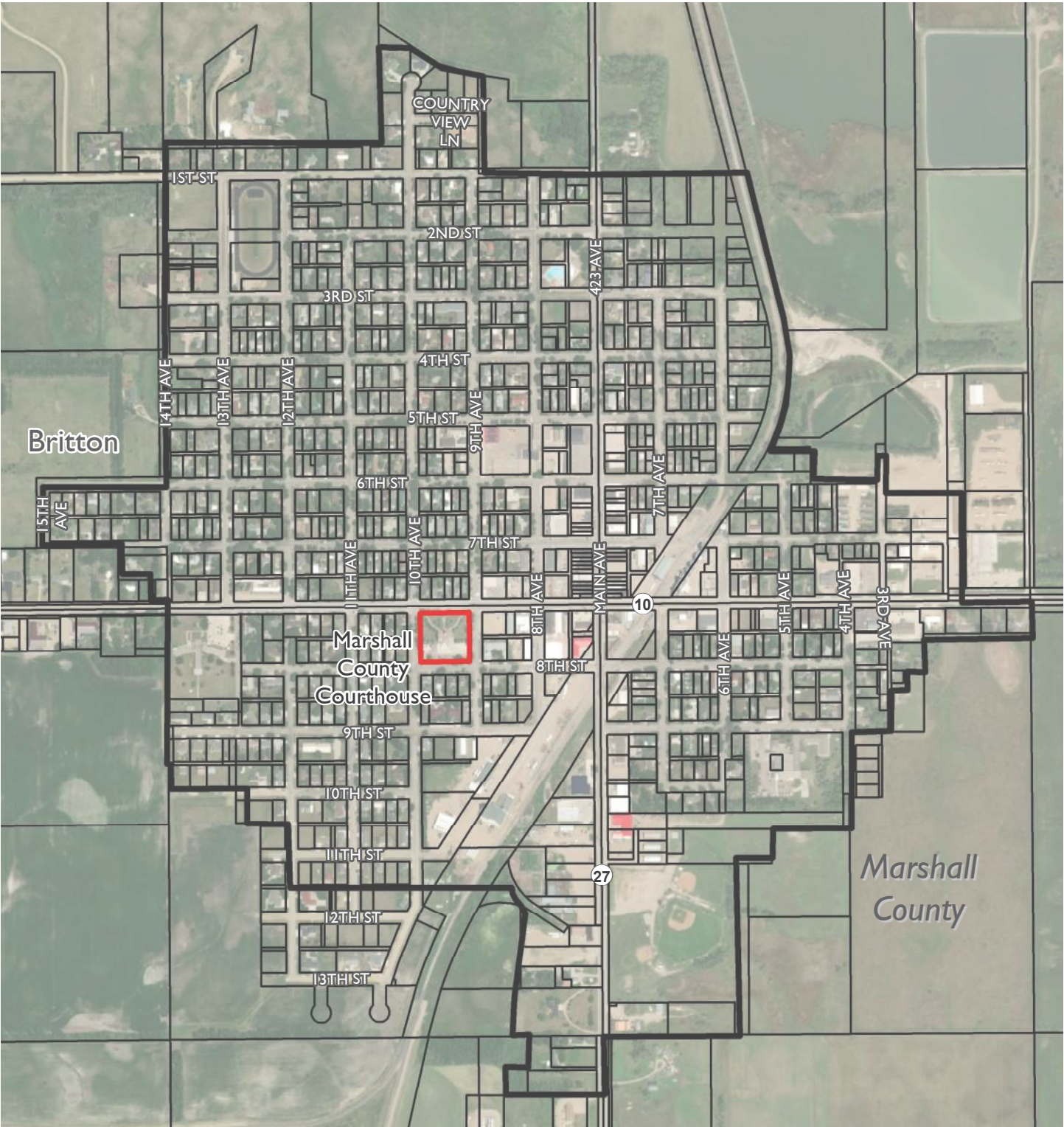
Scan the QR code or follow the link below  
to a 360° photo of this space!

[tourmkr.com/F1BbZGWTvH/16024168p,2950553m,258.10h,94.67t](https://tourmkr.com/F1BbZGWTvH/16024168p,2950553m,258.10h,94.67t)



# Marshall County Courthouse

LOCATION



Courthouse location within Britton, SD



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# Marshall County Courthouse

## SITE MAP



*Aerial view of Marshall County Courthouse*

# Marshall County Courthouse

## SITE + CIVIL CONDITIONS

### DRAINAGE, PEDESTRIAN, AND VEHICLE ROUTES

General improvements are needed to site drainage, and pedestrian and vehicle routes including sidewalks and parking areas.

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Drainage	Building Perimeter	Poor	Areas around the building slope towards the building.	Regrade and seed/sod select locations to get the water to drain away from the building.	\$20,000
Grounds/Turf	Site Curbing—Property West Side	Poor	Curb is damaged and in various stages of deterioration.	Replace curb.	\$14,100
Vehicle Routes	Parking Lot Curb	Poor	Curb is damaged and in various stages of deterioration. This is causing gravel from the parking lot to erode into the grass and damage the grass.	Replace curb.	\$11,500
Vehicle Routes	Asphalt Parking Lot	Fair	Asphalt paving is deteriorating.	Replace asphalt pavement with concrete.	*\$58,400
Pedestrian Routes	Sidewalk Approach—Building North Side	Fair	Sidewalk is cracking.	Replace damaged concrete panels.	\$2,200
Pedestrian Routes	Sidewalk—East Side of Courthouse	Good	Propane tank is blocking the pedestrian route.	Create a pad adjacent to the sidewalk for the tank to sit on.	*\$3,400
Pedestrian Routes	Sidewalk—East Side of Courthouse	Poor	Propane tank is not guarded with bollards.	Install bollards around propane tank.	\$1,400
Pedestrian Routes	Sidewalk—South Entrance	Fair	Sidewalk panels have settled and the level change exceeds the maximum 1/4" requirement for accessibility.	Replace sidewalk panels at locations with a level change greater than 1/4".	\$2,600

\* Item would be resolved by the remodel indicated on page 51.



*Cracked concrete panels*



*Site drainage*



*Damaged curb*



*Mechanical equipment and propane tank*



*Pedestrian route*



*Downspout west side*



*Main historic entrance—north side*



*Parking*



*Courthouse grounds*



*Roof drainage*



*Site drainage*



*Parking and pedestrian route*

# Marshall County Courthouse

## STRUCTURAL CONDITIONS

### STRUCTURAL

Given the age, construction type, materials, and use of the Marshall County Courthouse, the building structure appears to be performing adequately. The majority of the structural elements appear to be in good condition with the exception of the three elements listed below, which are covered in more detail in this report.

- Northeast truss bearing deterioration
- Exposed ground floor slab reinforcement
- Foundation wall grout deterioration

No life safety concerns exist. Use of the structure will be prolonged if water infiltration is eliminated and monitored on a regular basis in the future.

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Exterior Roof	Northeast Roof Truss Bearing–Attic	Poor	Timber roof truss bearing at exterior masonry wall has been compromised due to extensive water damage at that bearing location. The water infiltration appears to have been corrected, but masonry wall and truss need to be addressed.	Repair timber roof truss bearing using construction documents prepared by a licensed structural engineer.	\$33,300
Exterior Roof	Roof Truss–Attic	Good	Typical wood trusses appear to be in good condition. Member are free of rot, bowing, and splitting.	Perform regular inspections.	\$0
Exterior Roof	Roof Framing–Attic	Good	Roof framing is in good condition with no visible signs of rot, excessive deflection or bowing. 1x roof decking appears to be in good condition	Perform regular inspections.	\$0
Exterior Roof	Spire Framing –Tower	Fair	No rot visible. There is evidence of moisture infiltration in the past. Moisture infiltration appears to have been mitigated.	Perform regular inspections.	\$0





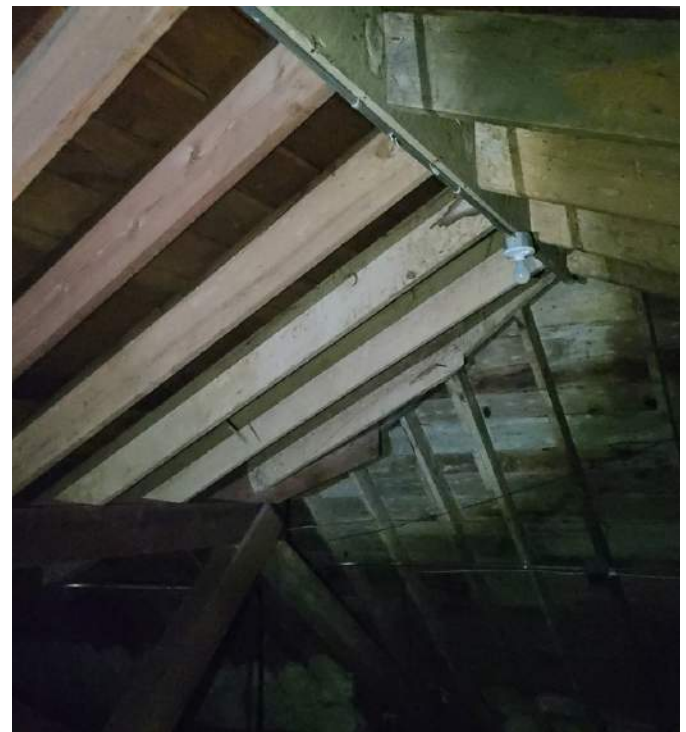
*Northeast roof truss bearing—attic*



*Roof truss—attic*



*Spire framing—tower*



*Roof framing—attic*

# Marshall County Courthouse

## ARCHITECTURAL CONDITIONS

### EXTERIOR

Roof gutter system, window sealant, and exterior masonry repairs are necessary for the building exterior.

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Exterior Roof	Roof Gutter System and Dome	Poor	The roof gutter system is missing corbels and has been patched several times with dissimilar materials. Does not function properly allowing water to run down the face of the building in several locations.	Investigate further as we were not able to access the area. Survey it with ISG drone.	\$2,700
Exterior Roof	Roof Gutter System	Poor	The roof gutter system is missing corbels and has been patched several times with dissimilar materials. It does not function properly resulting in water running down the face of the building in several locations.	Replace roof copper gutter system.	\$800,000
Exterior Walls	Chimney	Fair	Masonry joints are deteriorating.	Tuckpoint the chimney walls.	\$2,500
Exterior Walls	Exterior Block—North Wall	Fair	Block is shifting away from building but poses no structural concern.	Perform regular inspections.	\$0
Exterior Walls	Exterior Block	Fair	Caulk is separating from the block.	Perform exterior masonry repairs including tuckpointing.	\$83,200
Exterior Windows	Windows	Good	Windows drafty and inefficient.	Replace windows with historically consistent, energy efficient insulated windows.	\$164,600
Exterior - Other	High Roof Gutter—Downspout	Poor	Original downspout is missing on the east side.	Replace downspout.	\$1,000
Exterior - Other	Downspout—West Side	Fair	Downspout does not extend to grade.	Provide downspout extension and/or concrete splash block.	\$200





*Dome and high roof gutter downspout*



*Roof gutter system*



*Gutter system*



*Chimney*



*Exterior block-north wall*



*Exterior block caulk*



*Roof drainage and exterior foundation*



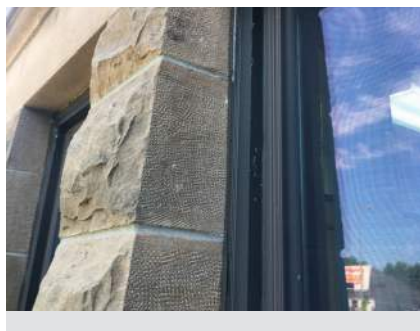
*Building exterior masonry*



*Exterior windows and roof gutter*



*Exterior window*



*Exterior window*



*Exterior window*

# Marshall County Courthouse

## ARCHITECTURAL CONDITIONS

### INTERIOR

Repairs and improvements are necessary to interior ceilings, walls, doors, and flooring.

Items marked with an asterisk (\*) would be resolved/addressed by the remodel project as identified in the concept floor plans in the Appendix of this report.

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Interior Ceiling	Clerk of Courts	Good	There are water stains on the ceiling around the light fixture and near the wall.	Investigate cause of water infiltration and repair.	\$0
Interior Ceiling	Ground Floor Slab– Basement	Fair	Reinforcing bars in elevated concrete slab supporting the ground floor are exposed to the basement below and are therefore susceptible to corrosion.	Grout the exposed reinforcing bars.	\$6,700
Interior Ceiling	Ceiling Framing–Attic	Good	Ceiling framing is in good condition. Some members appeared to be slightly bowing but do not appear to be of structural concern.	Perform regular inspections.	\$0
Interior Ceiling	Courtroom	Good	The original ceiling is covered with ACT ceiling and grid.	Remove ACT ceiling and grid. Refinish and restore original ceiling.	\$19,200
Interior Walls	Law Library– Third Floor	Fair	Wall paint is water damaged and peeling.	Investigate cause of water infiltration and repair.	\$0
Interior Walls	Courtroom– South Wall	Fair	Wall paint is water damaged and peeling.	Investigate cause of water infiltration and repair.	\$0
Interior Walls	Foundation Wall–Exterior Basement Entrance	Fair	Mortar joints are deteriorated in basement wall.	Tuckpoint deteriorated mortar joints.	\$5,400
Interior Walls	Steel Framing– Tower	Good	Steel framing at tower is in good condition. No visible corrosion, bowing, or excessive deflection.	Perform regular inspections.	\$0





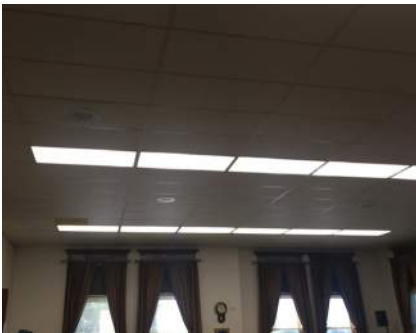
*Ceiling framing-attic*



*Interior ceiling*



*Ground floor slab*



*Courtroom ceiling*



*Law library-third floor interior walls*



*Courtroom-south wall*



*Foundation wall-basement entrance*



*Steel framing tour*



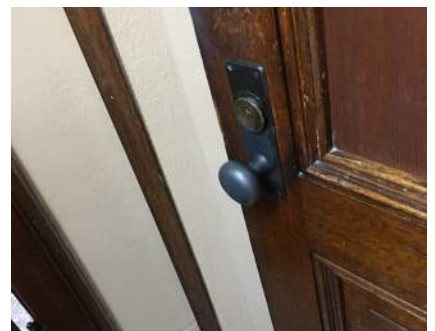
*Courtroom judge's bench*



*Breakroom*



*Interior window and sill*



*Traditional door handle*

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Interior Walls	Courtroom—Judge's Seat	Good	Woodwork and mural are in good condition.	Perform routine maintenance and refinish when needed.	\$0
Interior Walls	Breakroom	Fair	Wood paneling is dated and shows signs of wear, especially around the sink.	Remove wood paneling, install tile around sink, and repaint remainder of walls.	\$2,100*
Interior Windows	Interior window sills	Fair	Window sills and frames are showing signs of water and sun damage.	Refinish select window sills and frames.	\$10,000
Interior Doors	Door Knobs	Good	Door knobs are not accessible.	Review with historic preservation guidelines and consider replacing with lever.	\$9,000
Interior Doors	Vault Doors	Good	Vault doors are not accessible.	Consider replacing the vault doors at the time of remodel / renovation. At minimum, replace vault doors leading to rooms accessed by the public.	\$14,000*
Interior Doors	Door Panels	Good	Some doors damaged and worn.	Perform routine maintenance and refinish wood doors as needed.	\$0
Interior Doors	Planning and Zoning Office	Fair	The office only has one exit which is through a non-accessible vault door.	Replace vault door, or add additional door into corridor if it is acceptable to the historic character of the building.	\$5,400*
Interior Floors	Custodial Closet—Third Floor	Fair	Wood floor is unfinished and susceptible to water damage.	Seal wood flooring or install LVT flooring.	\$300*
Interior Floors	Courtroom—West Side	Poor	Carpet is torn and exposing hardwood flooring.	Replace carpet.	\$8,000*
Interior Floors	Concrete Step—Basement	Poor	Step is greatly deteriorated but poses no structural concern.	Replace the basement step.	\$1,400*
Interior Floors	Flooring—Planning and Zoning Office, Auditor's Vault, County Commission Room, and other areas	Poor	Carpet shows signs of wear and deterioration. Carpet is bubbling up in a few locations, is worn and has surpassed its useful service life.	Replace carpet throughout the building with carpet tile for ease of future replacement and maintenance.	\$38,300*
Interior Floors	Tile Flooring	Poor	Flooring tile adhesive may contain asbestos.	Test for asbestos and remove as needed.	\$3,500*
Interior Casework	County Offices	Fair	Work area lacks accessible counter and work surface.	Replace counter with a bi-level counter.	\$12,000*

\* Item would be resolved by the remodel indicated on page 51.





*Door panels*



*Vault doors*



*Custodial closet—third floor*



*Interior floors*



*Concrete step—basement*



*Carpeted floors—Planning and Zoning office*



*Carpeted flooring—Auditors' vault*



*Carpeted flooring—County Commission room*



*Interior casework—County offices*



*Courtroom*



*Courtroom*



*Wood handrail*

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Interior Casework	Planning and Zoning Office	Poor	Casework showing signs of wear.	Replace cabinetry.	\$2,400*
Interior - Other	Women's Restroom—Third Floor	Fair	Restroom stall is located on a raised platform and not accessible.	Install a portable ramp accessible stall.	\$13,300*
Interior - Other	Restroom—Judge's	Fair	Restroom stall is located on a raised platform and not accessible.	Examine the floor structure and either remove the platform or provide a ramp to allow access to the water closet and lavatory.	\$10,000*
Interior - Other	Restroom—Jury Room	Good	Restroom lacks signage.	Install a restrooms sign with accessibility symbol.	\$200*
Interior - Other	Wood Handrails	Fair	Wood finish is wearing off, leaving the wood railing susceptible to increased deterioration.	Refinish wood hand railings.	\$300*
Interior - Other	Restroom—Jury Room	Good	Missing wood trim at wall access below lavatory.	Replace wood trim at access panel.	\$100*
Interior - Other	Courtroom	Good	Witness stand is not accessible.	Remodel jury stand to provide an accessible witness stand.	\$700
Interior - Other	Courtroom	Fair	Jury box is not accessible.	Remodel jury box and provide accessible seating option.	\$5,700
Interior - Other	Vertical Circulation	Poor	Building only has one way to third floor.	Install an elevator to meet requirements as a secondary exit.	\$470,000*
Interior - Other	Attic—Bat Feces/Avian Pathogens	Poor	There are bat droppings throughout the attic floor.	Remove bat feces/avian pathogens.	\$58,200

## PLUMBING + RESTROOMS

Restroom improvements are necessary for accessibility and to meet ADA requirements.

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Plumbing - Water	Sprinkler System	Poor	There is currently no sprinkler system installed.	Install a fire sprinkler system.	\$119,900
Restrooms	Women's Restroom—First Floor	Fair	Lavatory and vanity are not accessible.	Replace the lavatory and vanity.	\$700*
Other - Plumbing	Drinking Fountain	Fair	Drinking fountain is not accessible.	Replace drinking fountain with bi-level accessible fountain.	\$1,500*

\* Item would be resolved by the remodel indicated on page 51.



*Restroom fixtures and step*



*Restroom signage*



*Women's restroom*



*Restroom fixtures and floors*



*Restroom fixtures*



*Restroom fixtures*



*Restroom fixtures*



*Restroom*



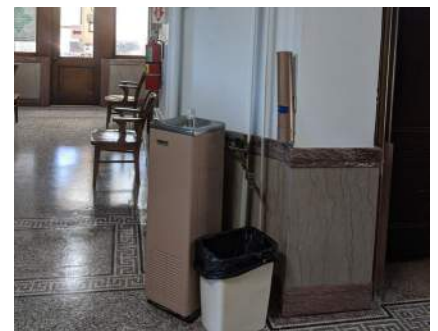
*Restroom floors*



*Restroom fixtures and doors*



*Restroom fixtures*



*Water fountain*



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# Marshall County Courthouse

## MECHANICAL CONDITIONS

### HEATING + COOLING

Replacement of major heating, cooling, and ventilations systems are necessary.

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Heating/ Cooling	Bryan Electric Boiler	Fair	Boiler was built in 2007. Evaluate switching out the electric boiler with a gas fired boiler.	Replace electric boiler with a gas fired boiler. (Price is included in HVAC replacement cost.) \$70,000	\$0
Heating/ Cooling	HVAC Units	Poor	HVAC units were installed in 2007. It is a 2-pipe system. Controls were installed at the same time. System does not provide dehumidification. System does not supply code required fresh air.	Replace HVAC system.	\$1,630,000
Heating/ Cooling	York Chiller	Fair	A York Chiller was installed in 2007 and contains R22 refrigerant. The refrigerant is no longer available.	Replace with 50 ton chiller. (Price is included in HVAC replacement cost.) \$150,000	\$0



Boiler



Meeting room vertical univent



Heat vent



Mechanical equipment



Controls



Heat vent



Vertical univent



HVAC vent



Piping and electrical



PVC piping



Chiller



Chiller

# Marshall County Courthouse

## ELECTRICAL + TECHNOLOGY CONDITIONS

### POWER, FIRE ALARMS, AND LIGHTING

Exterior lighting and fire alarm improvements are necessary to increase energy efficiency and address occupant safety.

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Power Supply	Electrical Panels	Good	The power supply was updated in 2007.	Perform regular maintenance.	\$0
Power Supply	Outlets	Good	Outlets were added in 2007 with the addition of a wiremold raceway.	Perform regular maintenance.	\$0
Exterior Lighting	Exterior Lighting	Poor	Exterior lighting is outdated and inefficient.	Install LED lighting and controls.	\$1,000
Interior Lighting	Interior Lighting	Poor	Existing lighting is fluorescent tubes.	Install LED lighting and controls.	\$128,100
Life Safety	On-Site Generator	Good	Generator is an Olympian G75FIS.	Perform regular maintenance.	\$0
Life Safety	Fire Alarm	Poor	Fire alarm system has reached the end of its useful service life.	Replace fire alarm panel.	\$81,500
*Power Supply	Electrical Panels	Poor	Electrical panel is located within Clerk of Courts vault	Relocate electrical panel to second floor electrical room.	\$15,000*

\* Item would be resolved by the remodel indicated on page 51.





Electric panelboard



Electric receptacles/outlets



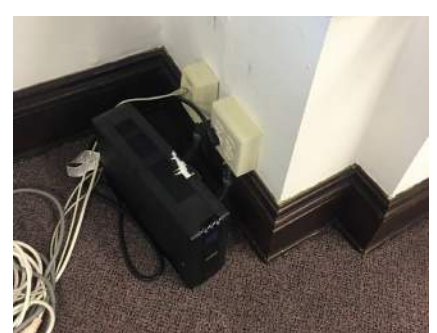
Electrical panelboard



Electrical panelboard



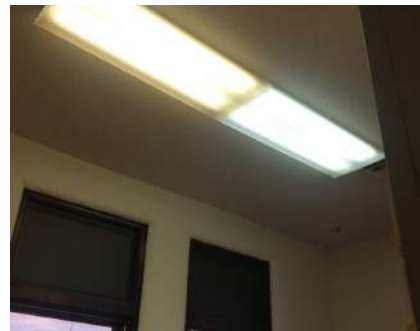
Electrical panelboard



Receptacles



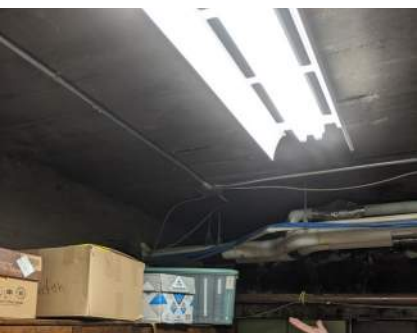
Exterior lighting



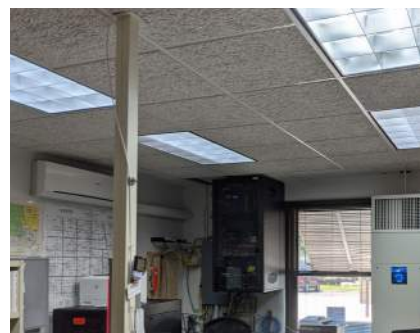
Interior lighting



Generator



Lighting

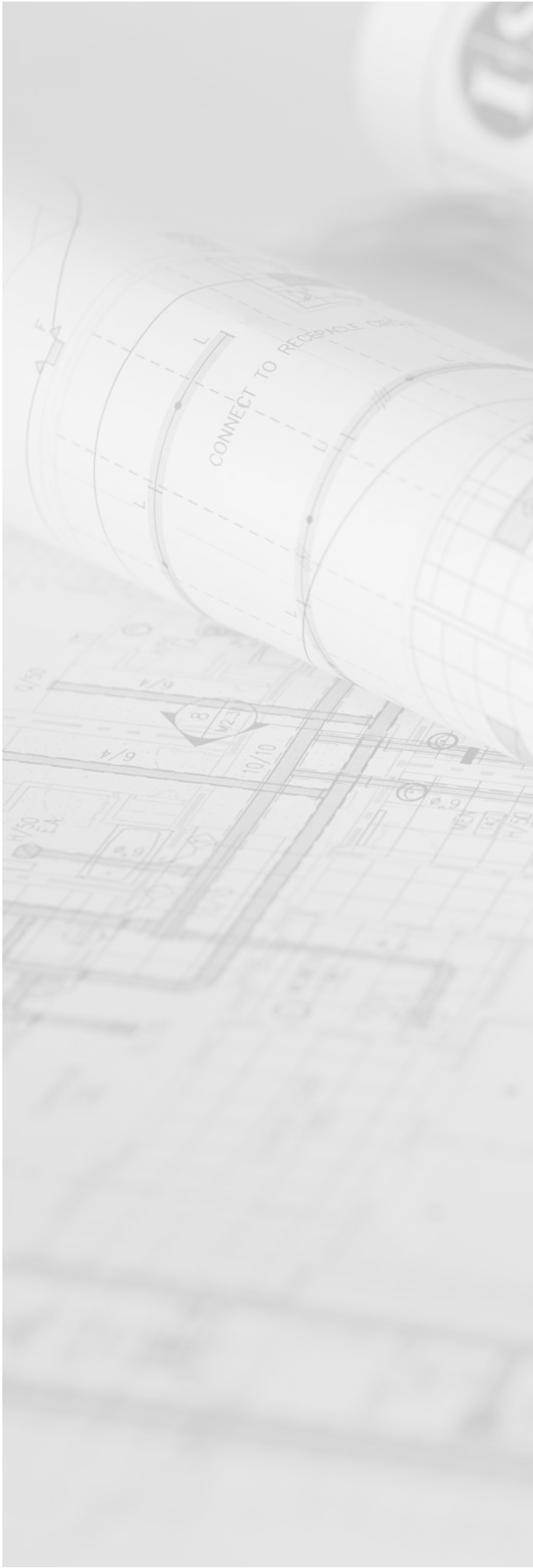


Lighting



Fire alarm

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# Appendix

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# Appendix

## TOP 10 RECOMMENDATIONS LIST

Recommendation	Item	Cost
1	Roof timber fix*	\$33,300
2	Regrade around building perimeter to ensure positive drainage away from building**	\$20,000
3	HVAC upgrade (includes chiller and boiler replacement)***	\$1,630,000
4	Redo rain gutter system**	\$800,000
5	Replace windows**	\$164,000
6	Tuckpointing**	\$83,200
7	LED lighting upgrade***	\$128,000
8	Replace fire alarm****	\$81,500
9	Install elevator	\$470,000
10	Remodel restrooms to be accessible	\$23,800

\*Important structural issue

\*\*Combine items for cost efficiency

\*\*\*Combine items for cost efficiency

# Appendix

## COST ESTIMATES

### SITE + CIVIL

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Drainage	Building Perimeter	Poor	Areas around the building slope towards the building.	Regrade and seed/sod select locations to get the water to drain away from the building.	\$20,000
Grounds/Turf	Site Curbing—Property West Side	Poor	Curb is damaged and in various stages of deterioration.	Replace curb.	\$14,100
Vehicle Routes	Parking Lot Curb	Poor	Curb is damaged and in various stages of deterioration. This is causing gravel from the parking lot to erode into the grass and damage the grass.	Replace curb.	\$11,500
Vehicle Routes	Asphalt Parking Lot	Fair	Asphalt paving is deteriorating.	Replace asphalt pavement with concrete.	\$58,400*
Pedestrian Routes	Sidewalk Approach—Building North Side	Fair	Sidewalk is cracking.	Replace damaged concrete panels.	\$2,200
Pedestrian Routes	Sidewalk—East Side of Courthouse	Good	Propane tank is blocking the pedestrian route.	Create a pad adjacent to the sidewalk for the tank to sit on.	\$3,400*
Pedestrian Routes	Sidewalk—East Side of Courthouse	Poor	Propane tank is not guarded with bollards.	Install bollards around propane tank.	\$1,400
Pedestrian Routes	Sidewalk—South Entrance	Fair	Sidewalk panels have settled and the level change exceeds the maximum 1/4" requirement for accessibility.	Replace sidewalk panels at locations with a level change greater than 1/4".	\$2,600

\* Item would be resolved by the remodel indicated on page 51.

## ARCHITECTURAL + STRUCTURAL

### EXTERIOR

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Exterior Roof	Northeast Roof Truss Bearing–Attic	Poor	Timber roof truss bearing at exterior masonry wall has been compromised due to extensive water damage at that bearing location. The water infiltration appears to have been corrected, but masonry wall and truss need to be addressed.	Repair timber roof truss bearing using construction documents prepared by a licensed structural engineer.	\$33,300
Exterior Roof	Roof Truss–Attic	Good	Typical wood trusses appear to be in good condition. Member are free of rot, bowing, and splitting.	Perform regular inspections.	\$0
Exterior Roof	Roof Framing–Attic	Good	Roof framing is in good condition with no visible signs of rot, excessive deflection or bowing. 1x roof decking appears to be in good condition	Perform regular inspections.	\$0
Exterior Roof	Spire Framing – Tower	Fair	No rot visible. There is evidence of moisture infiltration in the past. Moisture infiltration appears to have been mitigated.	Perform regular inspections.	\$0
Exterior Roof	Roof Gutter System and Dome	Poor	The roof gutter system is missing corbels and has been patched several times with dissimilar materials. Does not function properly allowing water to run down the face of the building in several locations.	Investigate further as we were not able to access the area. Survey it with ISG drone.	\$2,700
Exterior Roof	Roof Gutter System	Poor	The roof gutter system is missing corbels and has been patched several times with dissimilar materials. It does not function properly resulting in water running down the face of the building in several locations.	Replace roof copper gutter system.	\$800,000

## ARCHITECTURAL + STRUCTURAL

## EXTERIOR

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Exterior Walls	Chimney	Fair	Masonry joints are deteriorating.	Tuckpoint the chimney walls.	\$2,500
Exterior Walls	Exterior Block–North Wall	Fair	Block is shifting away from building but poses no structural concern.	Perform regular inspections.	\$0
Exterior Walls	Exterior Block	Fair	Caulk is separating from the block.	Perform exterior masonry repairs including tuckpointing.	\$83,200
Exterior Windows	Windows	Good	Windows are drafty and inefficient.	Reseal windows.	\$13,300
Exterior Windows	Windows	Good	Windows drafty and inefficient.	If resealing does not resolve the issue, consider replacing windows with historically consistent, energy efficient insulated windows.	\$164,600
Exterior - Other	High Roof Gutter–Downspout	Poor	Original downspout is missing on the east side.	Replace downspout.	\$1,000
Exterior - Other	Downspout–West Side	Fair	Downspout does not extend to grade.	Provide downspout extension and/or concrete splash block.	\$200



## ARCHITECTURAL + STRUCTURAL

### INTERIOR

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Interior Ceiling	Clerk of Courts	Good	There are water stains on the ceiling around the light fixture and near the wall.	Investigate cause of water infiltration and repair.	\$0
Interior Ceiling	Ground Floor Slab— Basement	Fair	Reinforcing bars in elevated concrete slab supporting the ground floor are exposed to the basement below and are therefore susceptible to corrosion.	Grout the exposed reinforcing bars.	\$6,700
Interior Ceiling	Ceiling Framing—Attic	Good	Ceiling framing is in good condition. Some members appeared to be slightly bowing but do not appear to be of structural concern.	Perform regular inspections.	\$0
Interior Ceiling	Courtroom	Good	The original ceiling is covered with ACT ceiling and grid.	Remove ACT ceiling and grid. Refinish and restore original ceiling.	\$19,200
Interior Walls	Law Library—Third Floor	Fair	Wall paint is water damaged and peeling.	Investigate cause of water infiltration and repair.	\$0
Interior Walls	Courtroom—South Wall	Fair	Wall paint is water damaged and peeling.	Investigate cause of water infiltration and repair.	\$0
Interior Walls	Foundation Wall—Exterior Basement Entrance	Fair	Mortar joints are deteriorated in basement wall.	Tuckpoint deteriorated mortar joints.	\$5,400
Interior Walls	Steel Framing—Tower	Good	Steel framing at tower is in good condition. No visible corrosion, bowing, or excessive deflection.	Perform regular inspections.	\$0
Interior Walls	Courtroom—Judge's Seat	Good	Woodwork and mural are in good condition.	Perform routine maintenance and refinish when needed.	\$0
Interior Walls	Breakroom	Fair	Wood paneling is dated and shows signs of wear, especially around the sink.	Remove wood paneling, install tile around sink, and repaint remainder of walls.	\$2,100*
Interior Windows	Interior window sills	Fair	Window sills and frames are showing signs of water and sun damage.	Refinish select window sills and frames.	\$10,000

\* Item would be resolved by the remodel indicated on page 51.

## ARCHITECTURAL + STRUCTURAL

## INTERIOR

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Interior Doors	Door Knobs	Good	Door knobs are not accessible.	Review with historic preservation guidelines and consider replacing with lever.	\$9,000
Interior Doors	Vault Doors	Good	Vault doors are not accessible.	Consider replacing the vault doors at the time of remodel / renovation. At minimum, replace vault doors leading to rooms accessed by the public.	\$14,000*
Interior Doors	Door Panels	Good	Some doors damaged and worn.	Perform routine maintenance and refinish wood doors as needed.	\$0
Interior Doors	Planning and Zoning Office	Fair	The office only has one exit which is through a non-accessible vault door.	Replace vault door, or add additional door into corridor if it is acceptable to the historic character of the building.	\$5,400*
Interior Floors	Custodial Closet—Third Floor	Fair	Wood floor is unfinished and susceptible to water damage.	Seal wood flooring or install LVT flooring.	\$300*
Interior Floors	Courtroom—West Side	Poor	Carpet is torn and exposing hardwood flooring.	Replace carpet.	\$8,000*
Interior Floors	Concrete Step—Basement	Poor	Step is greatly deteriorated but poses no structural concern.	Replace the basement step.	\$1,400*
Interior Floors	Flooring—Planning and Zoning Office, Auditor's Vault, County Commission Room, and other areas	Poor	Carpet shows signs of wear and deterioration. Carpet is bubbling up in a few locations, is worn and has surpassed its useful service life.	Replace carpet throughout the building with carpet tile for ease of future replacement and maintenance.	\$38,300*
Interior Floors	Tile Flooring	Poor	Flooring tile adhesive may contain asbestos.	Test for asbestos and remove as needed.	\$3,500*
Interior Casework	County Offices	Fair	Work area lacks accessible counter and work surface.	Replace counter with a bi-level counter.	\$12,000*
Interior Casework	Planning and Zoning Office	Poor	Casework showing signs of wear.	Replace cabinetry.	\$2,400*

\* Item would be resolved by the remodel indicated on page 51.

## ARCHITECTURAL + STRUCTURAL

## INTERIOR

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Interior - Other	Women's Restroom—Third Floor	Fair	Restroom stall is located on a raised platform and not accessible.	Install a portable ramp accessible stall.	\$13,300*
Interior - Other	Restroom—Judge's	Fair	Restroom stall is located on a raised platform and not accessible.	Examine the floor structure and either remove the platform or provide a ramp to allow access to the water closet and lavatory.	\$10,000*
Interior - Other	Restroom—Jury Room	Good	Restroom lacks signage.	Install a restrooms sign with accessibility symbol.	\$200*
Interior - Other	Wood Handrails	Fair	Wood finish is wearing off, leaving the wood railing susceptible to increased deterioration.	Refinish wood hand railings.	\$300*
Interior - Other	Restroom—Jury Room	Good	Missing wood trim at wall access below lavatory.	Replace wood trim at access panel.	\$100*
Interior - Other	Courtroom	Good	Witness stand is not accessible.	Remodel jury stand to provide an accessible witness stand.	\$700
Interior - Other	Courtroom	Fair	Jury box is not accessible.	Remodel jury box and provide accessible seating option.	\$5,700
Interior - Other	Vertical Circulation	Poor	Building only has one way to third floor.	Install an elevator to meet requirements as a secondary exit.	\$470,000**
Interior - Other	Attic—Bat Feces/ Avian Pathogens	Poor	There are bat droppings throughout the attic floor.	Remove bat feces/avian pathogens.	\$58,200

\* Item would be resolved by the remodel indicated on page 51.

\*\* Elevator would be resolved by the new construction indicated on page 51.

**PLUMBING + RESTROOMS**

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Plumbing - Water	Sprinkler System	Poor	There is currently no sprinkler system installed.	Install a fire sprinkler system.	\$119,900
Restrooms	Women's Restroom— First Floor	Fair	Lavatory and vanity are not accessible.	Replace the lavatory and vanity.	\$700*
Other - Plumbing	Drinking Fountain	Fair	Drinking fountain is not accessible.	Replace drinking fountain with bi-level accessible fountain.	\$1,500*

\* Item would be resolved by the remodel indicated on page 51.

## HEATING + COOLING

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Heating/ Cooling	Bryan Electric Boiler	Fair	Boiler was built in 2007. Evaluate switching out the electric boiler with a gas fired boiler.	Replace electric boiler with a gas fired boiler. (Price is included in HVAC replacement cost.) \$70,000	\$0
Heating/ Cooling	HVAC Units	Poor	HVAC units were installed in 2007. It is a 2-pipe system. Controls were installed at the same time. System does not provide dehumidification. System does not supply code required fresh air.	Replace HVAC system.	\$1,630,000
Heating/ Cooling	York Chiller	Fair	A York Chiller was installed in 2007 and contains R22 refrigerant. The refrigerant is no longer available.	Replace with 50 ton chiller. (Price is included in HVAC replacement cost.) \$150,000	\$0

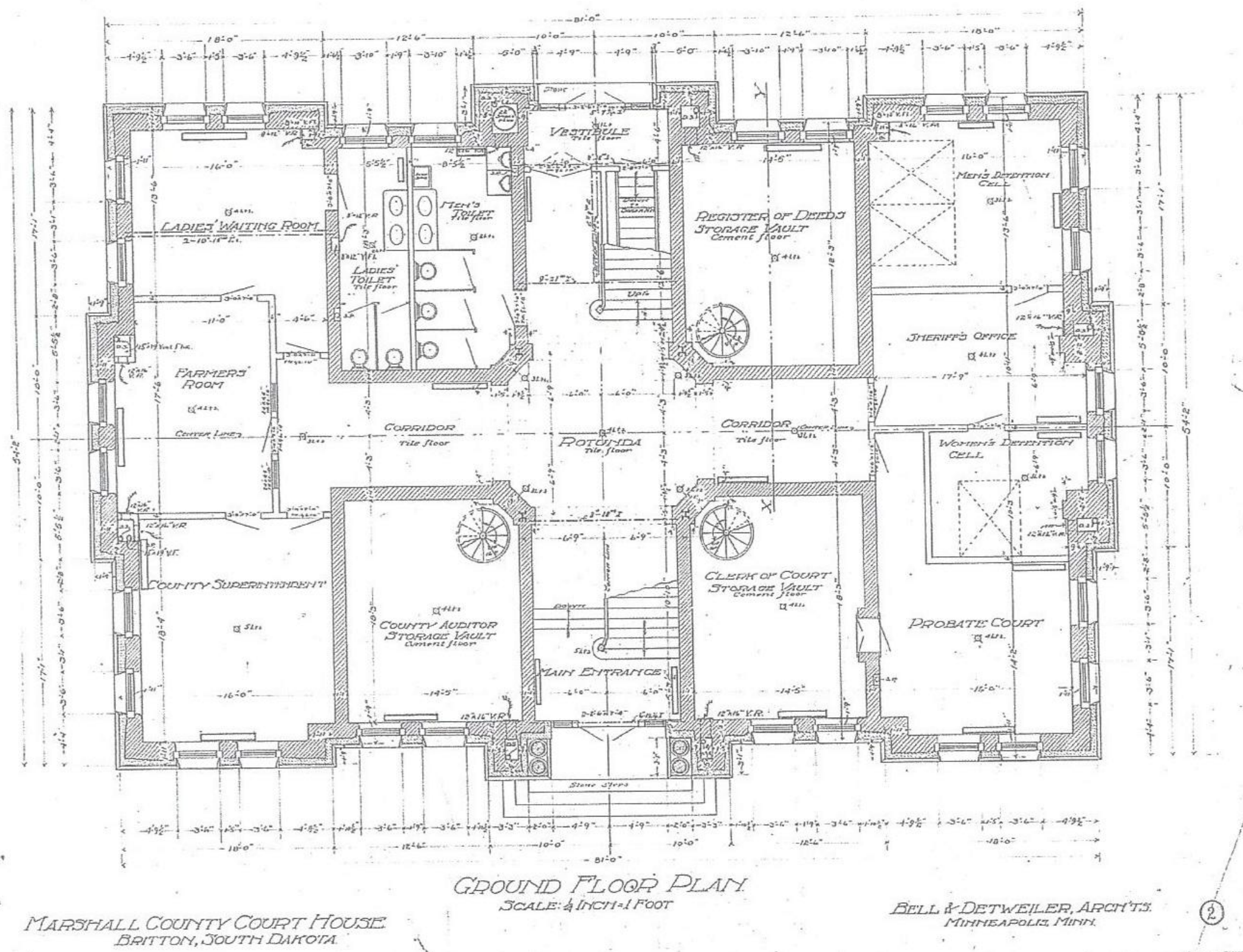


## POWER, FIRE ALARMS, AND LIGHTING

Sub Category	Element/Location	Condition	Details	Recommendation	Estimated Cost
Power Supply	Electrical Panels	Good	The power supply was updated in 2007.	Perform regular maintenance.	\$0
Power Supply	Outlets	Good	Outlets were added in 2007 with the addition of a wiremold raceway.	Perform regular maintenance.	\$0
Exterior Lighting	Exterior Lighting	Poor	Exterior lighting is outdated and inefficient.	Install LED lighting and controls.	\$1,000
Interior Lighting	Interior Lighting	Poor	Existing lighting is fluorescent tubes.	Install LED lighting and controls.	\$128,100
Life Safety	On-Site Generator	Good	Generator is an Olympian G75FIS.	Perform regular maintenance.	\$0
Life Safety	Fire Alarm	Poor	Fire alarm system has reached the end of its useful service life.	Replace fire alarm panel.	\$81,500
*Power Supply	Electrical Panels	Poor	Electrical panel is located within Clerk of Courts vault	Relocate electrical panel to second floor electrical room.	\$15,000*

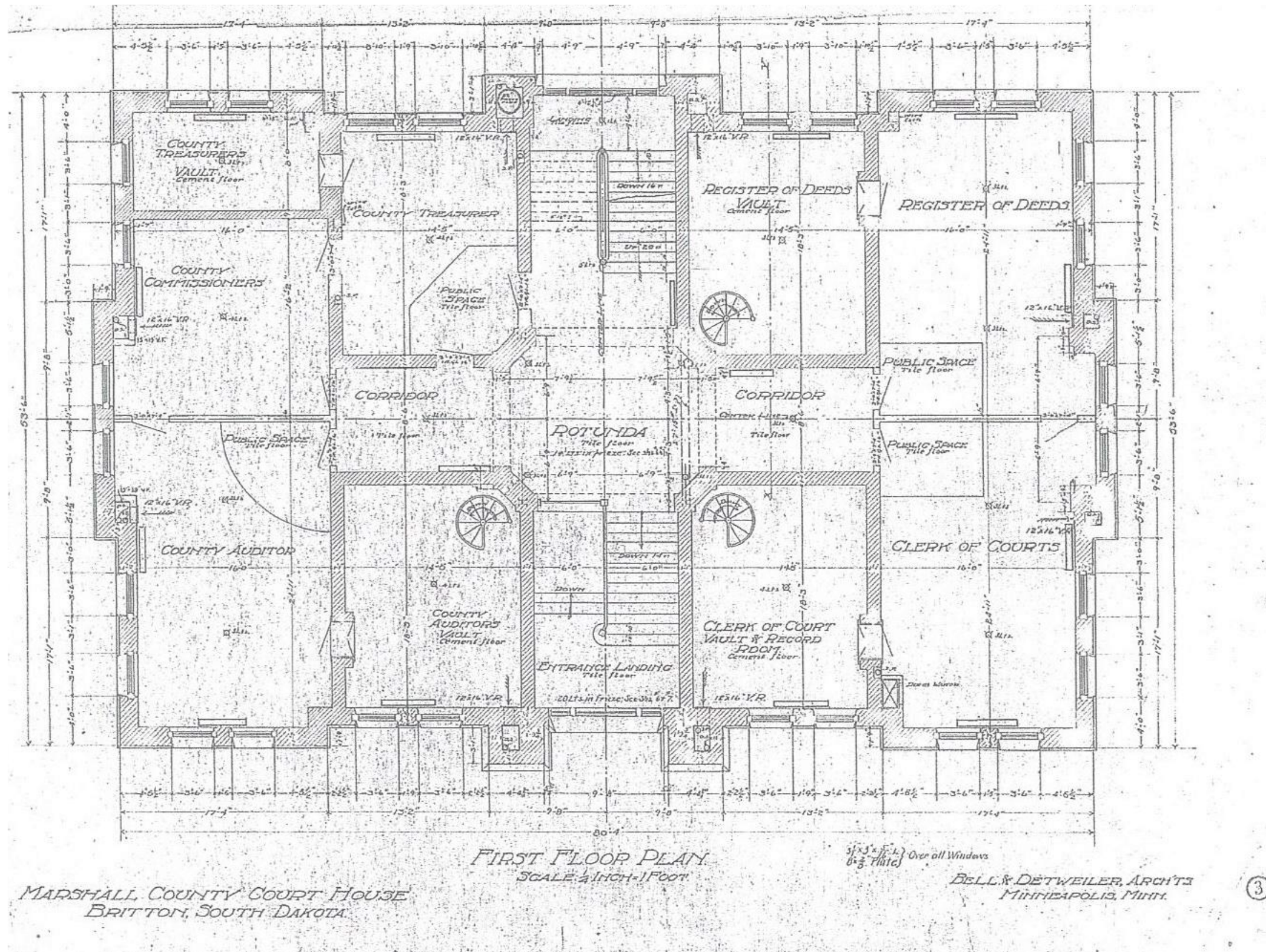
\* Item would be resolved by the remodel indicated on page 51.

Appendix  
HISTORIC FLOOR PLANS



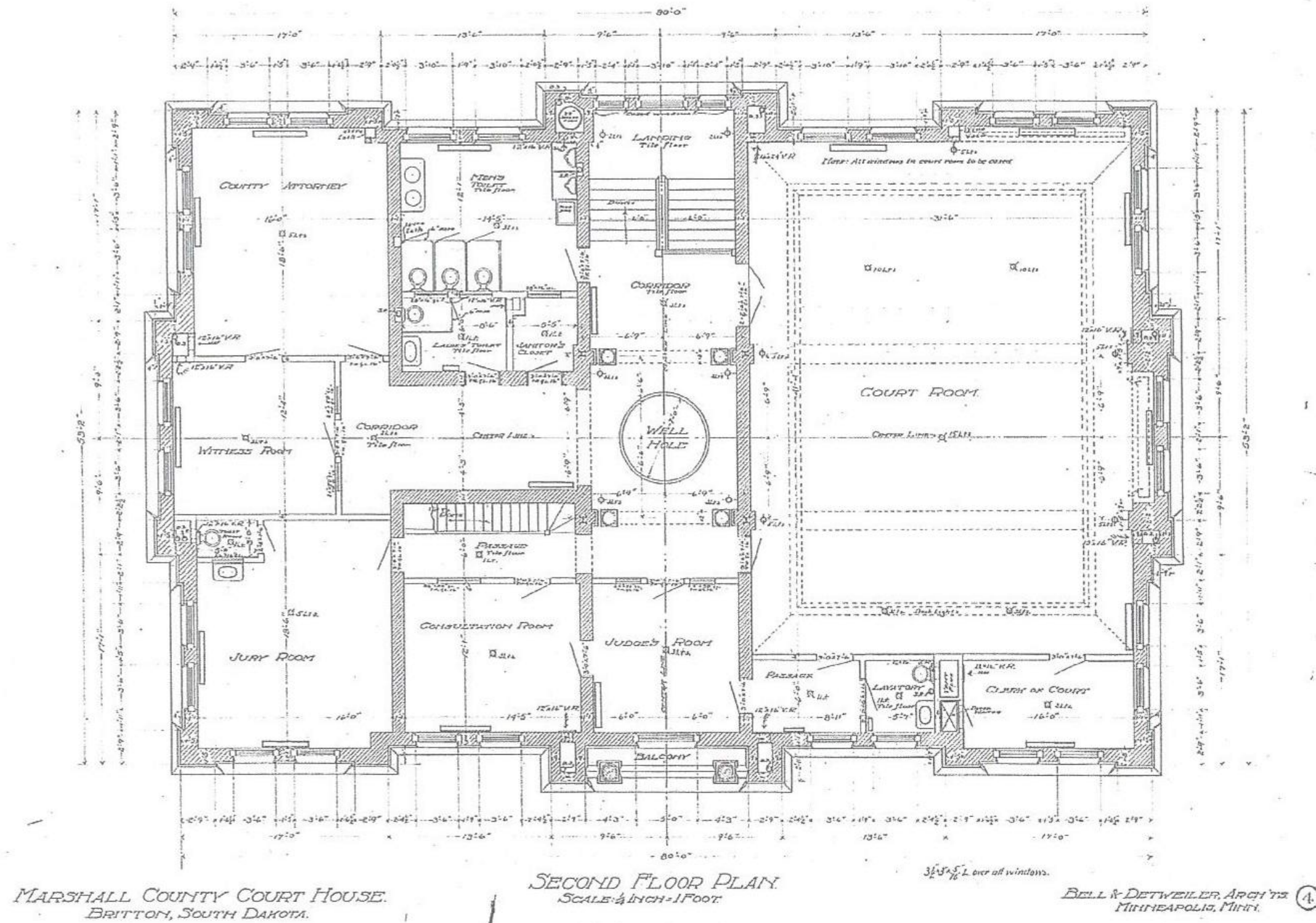
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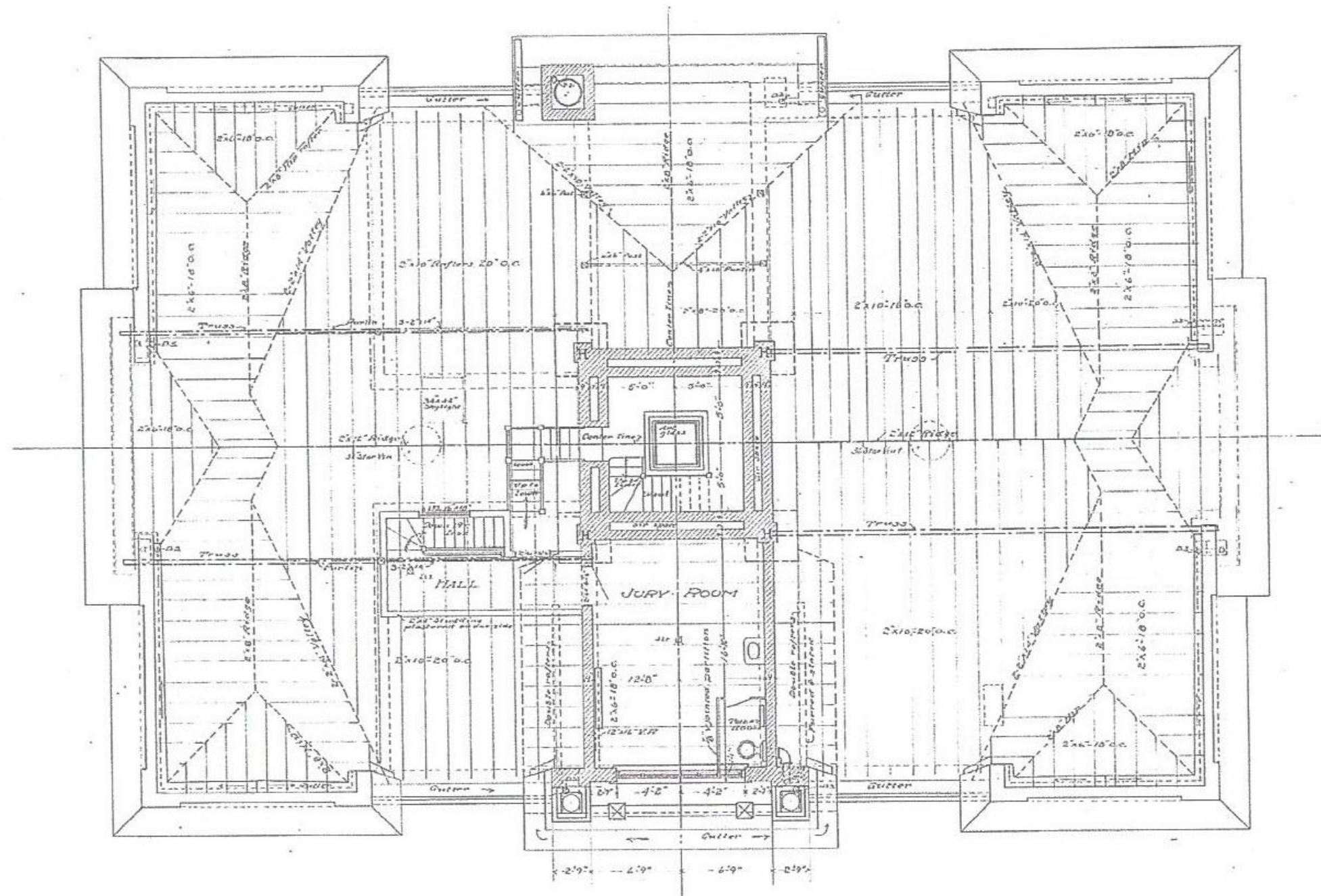
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MARSHALL COUNTY COURT HOUSE  
BRITTON, SOUTH DAKOTA.

ROOF PLAN  
SCALE: 1/4" = 1'-0"

BELL & DETWEILER, ARCH'TS  
MINNEAPOLIS, MINN.

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Appendix

FINAL CONCEPTS

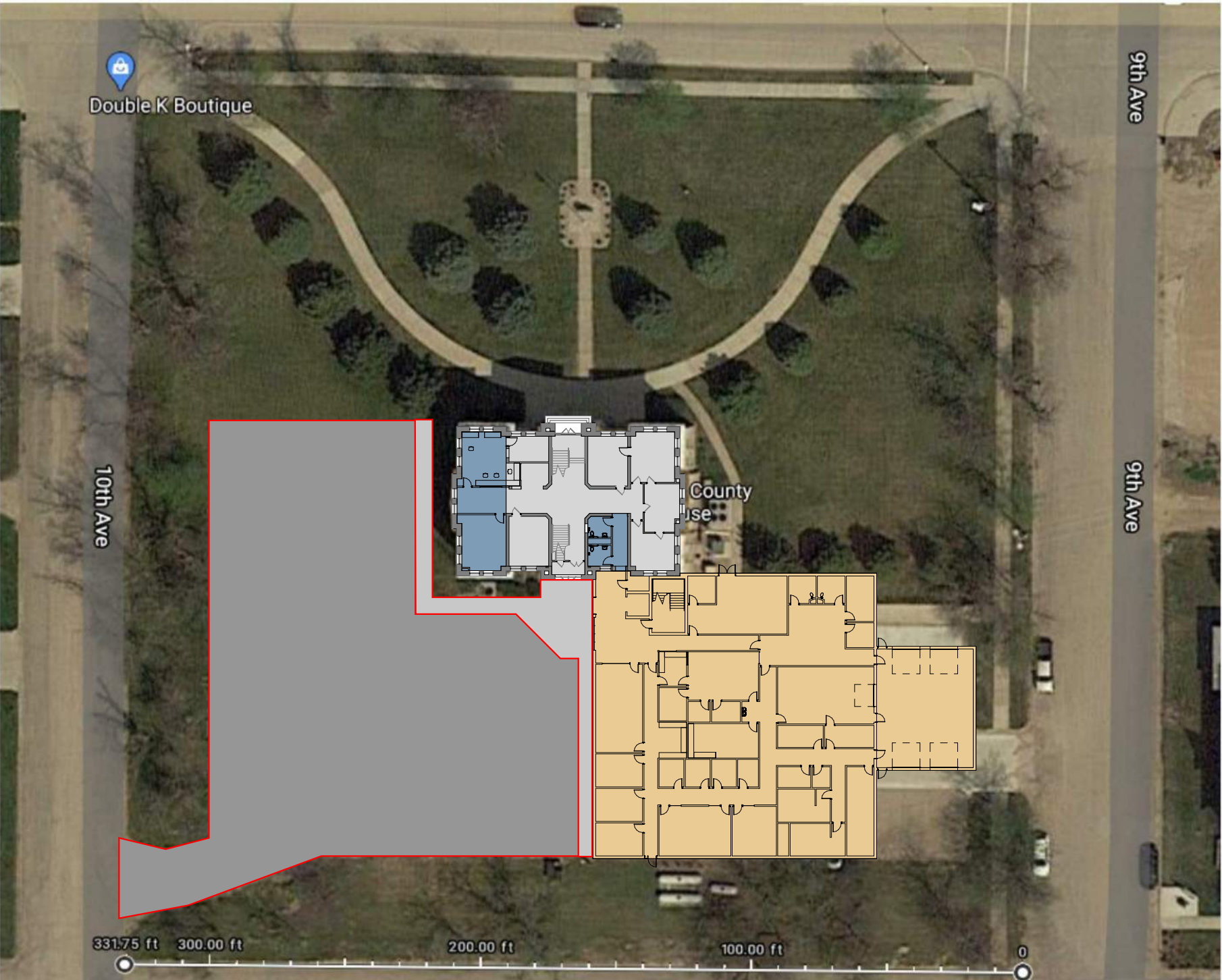
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COST ESTIMATE SUMMARY

Item	Cost
Remodel*	\$300,000 - \$350,000
Remaining Facility Updates	\$1.5M
HVAC Update and Replacement	\$1.6M
New Construction**	\$3.1M - \$3.4M
New Parking Lot	\$185,000
Total	\$6.7M - \$7M

\*Items with an asterisk on previous pages throughout the report are resolved as part of the remodel indicated on the conceptual plans.

\*\*Cost of new elevator included in new construction.



SITE PLAN



Architecture + Engineering + Environmental + Planning

COURTHOUSE ADDITION  
BRITTON, SOUTH DAKOTA -  
ISG PROJECT NO. 20-24490



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Sheet Number SD-01



CONCEPT GROUND FLOOR PLAN



Architecture + Engineering + Environmental + Planning

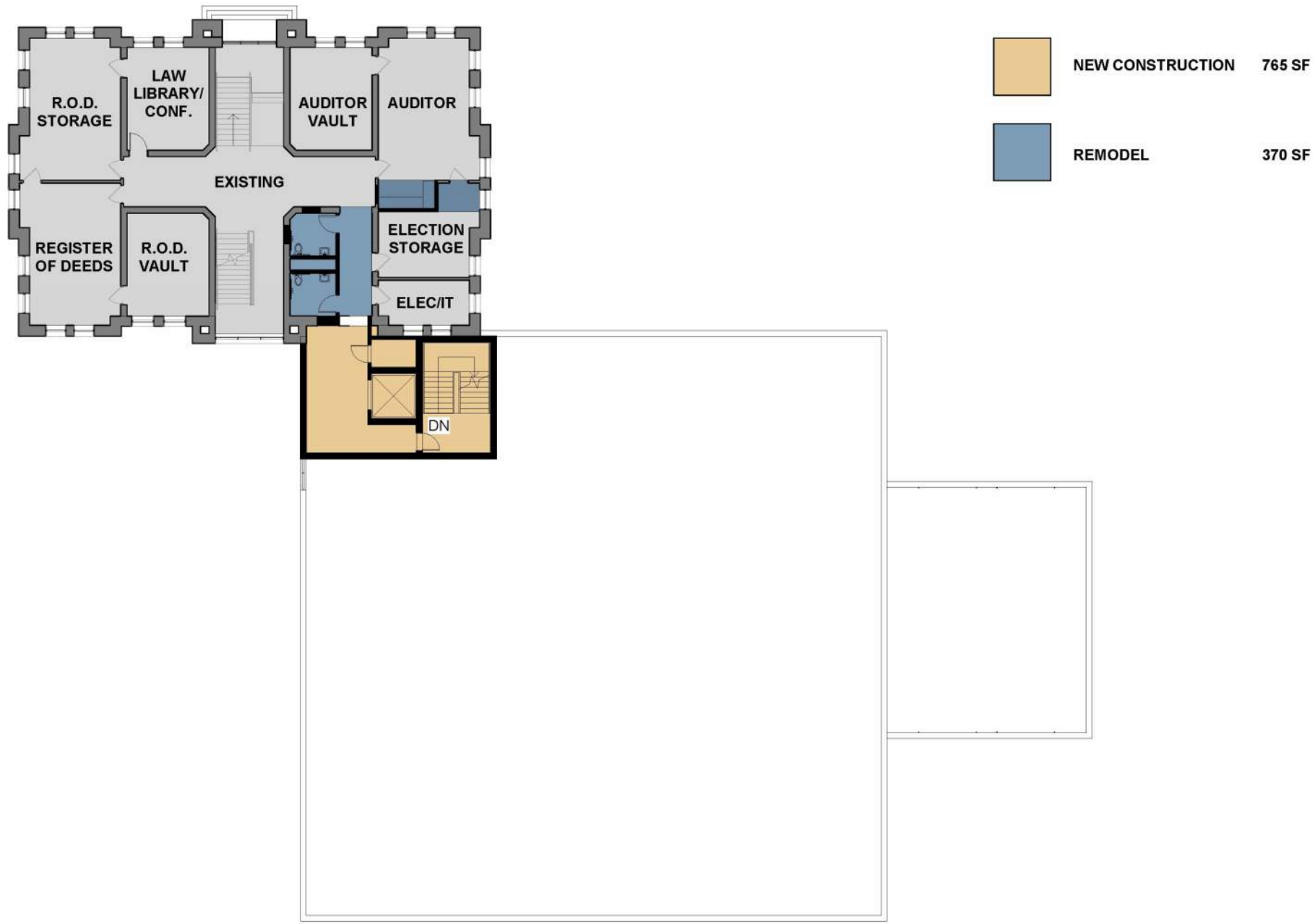
COURTHOUSE ADDITION  
BRITTON, SOUTH DAKOTA -  
ISG PROJECT NO. 20-24490



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CONCEPT SECOND FLOOR PLAN



Architecture + Engineering + Environmental + Planning

COURTHOUSE ADDITION  
BRITTON, SOUTH DAKOTA -  
ISG PROJECT NO. 20-24490



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CONCEPT THIRD FLOOR PLAN



Architecture + Engineering + Environmental + Planning

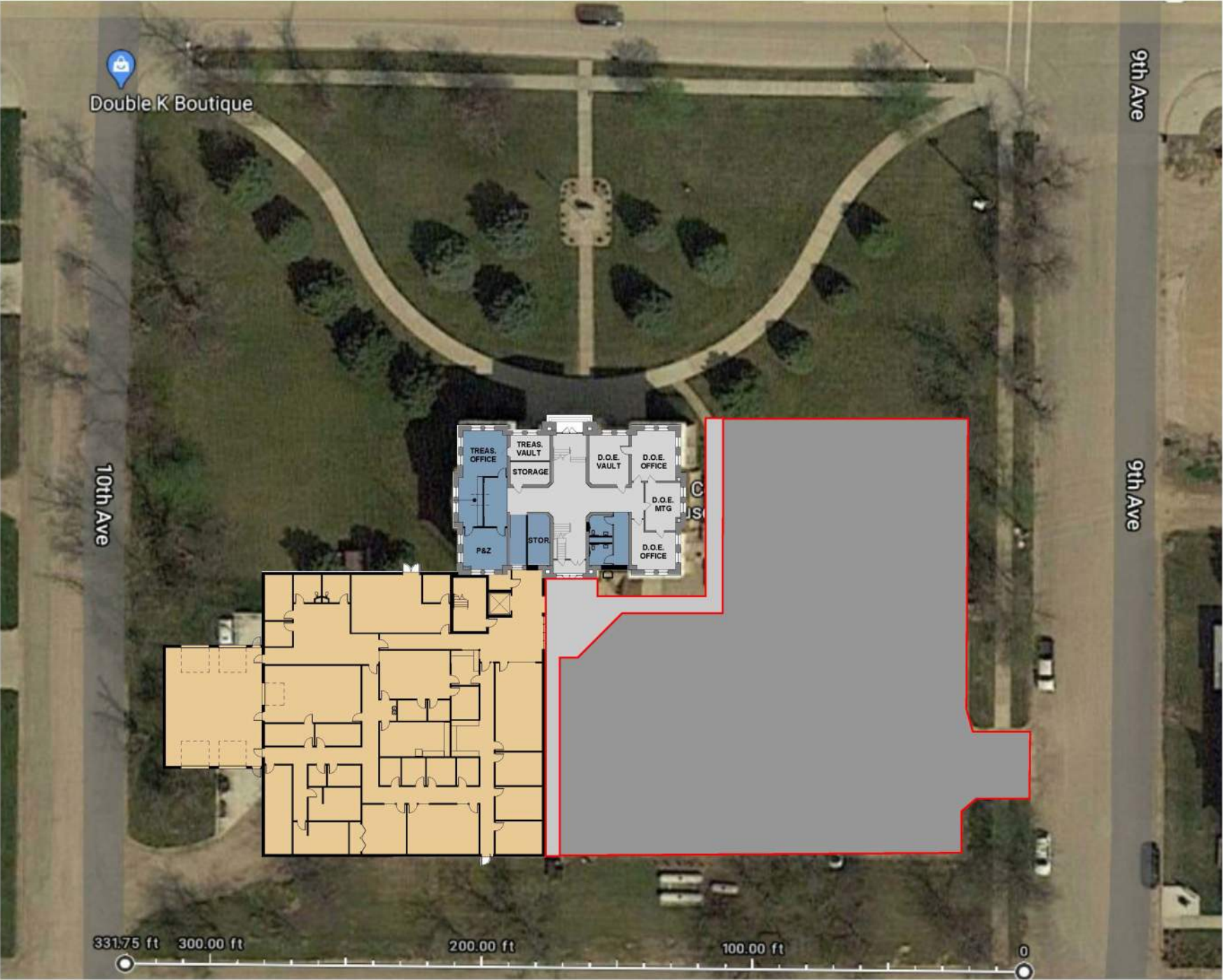
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BRITTON, SOUTH DAKOTA -  
ISG PROJECT NO. 20-24490



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SITE PLAN



Architecture + Engineering + Environmental + Planning

COURTHOUSE ADDITION  
BRITTON, SOUTH DAKOTA -  
ISG PROJECT NO. 20-24490



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CONCEPT GROUND FLOOR PLAN



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BRITTON, SOUTH DAKOTA -  
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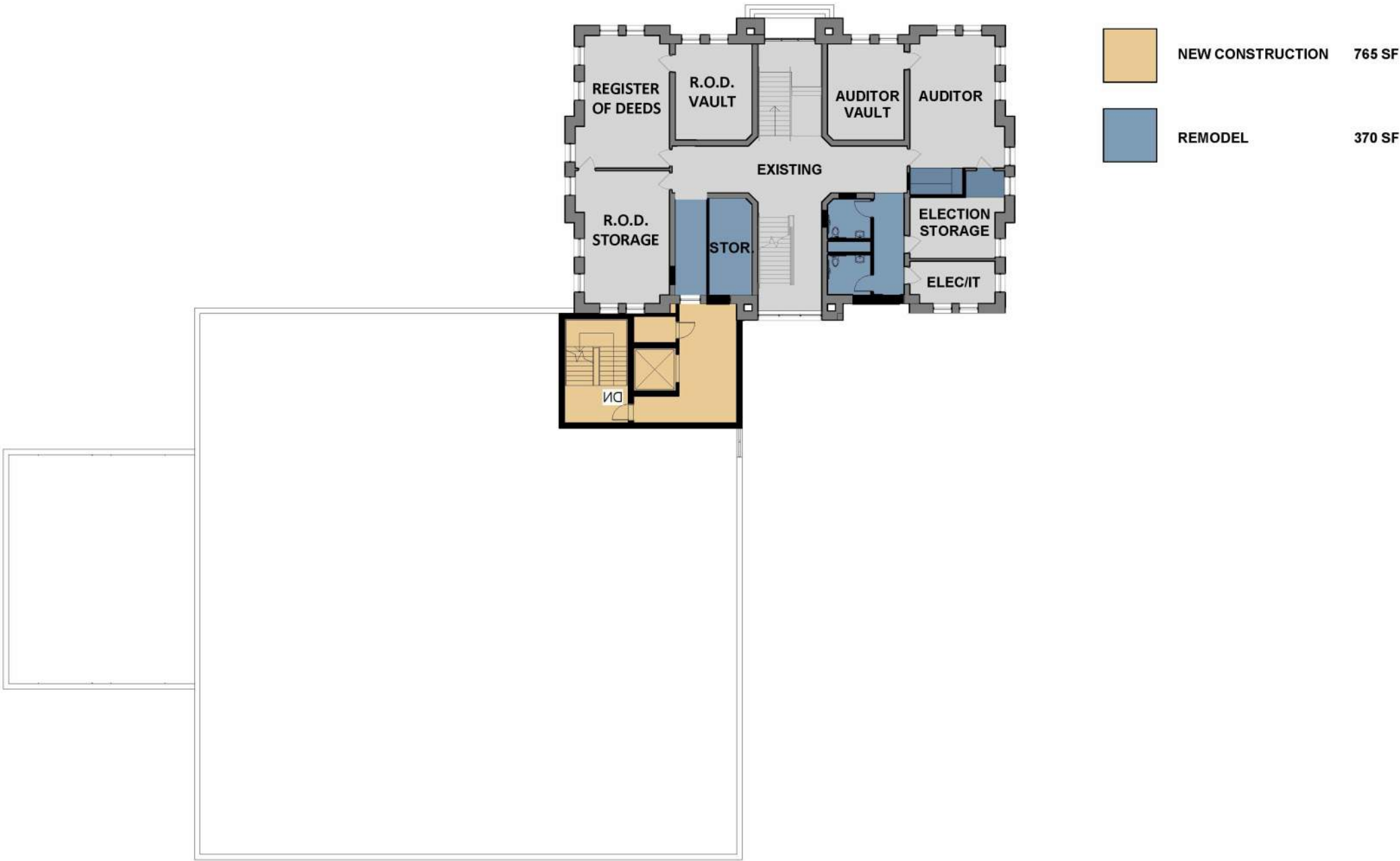


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CONCEPT SECOND FLOOR PLAN



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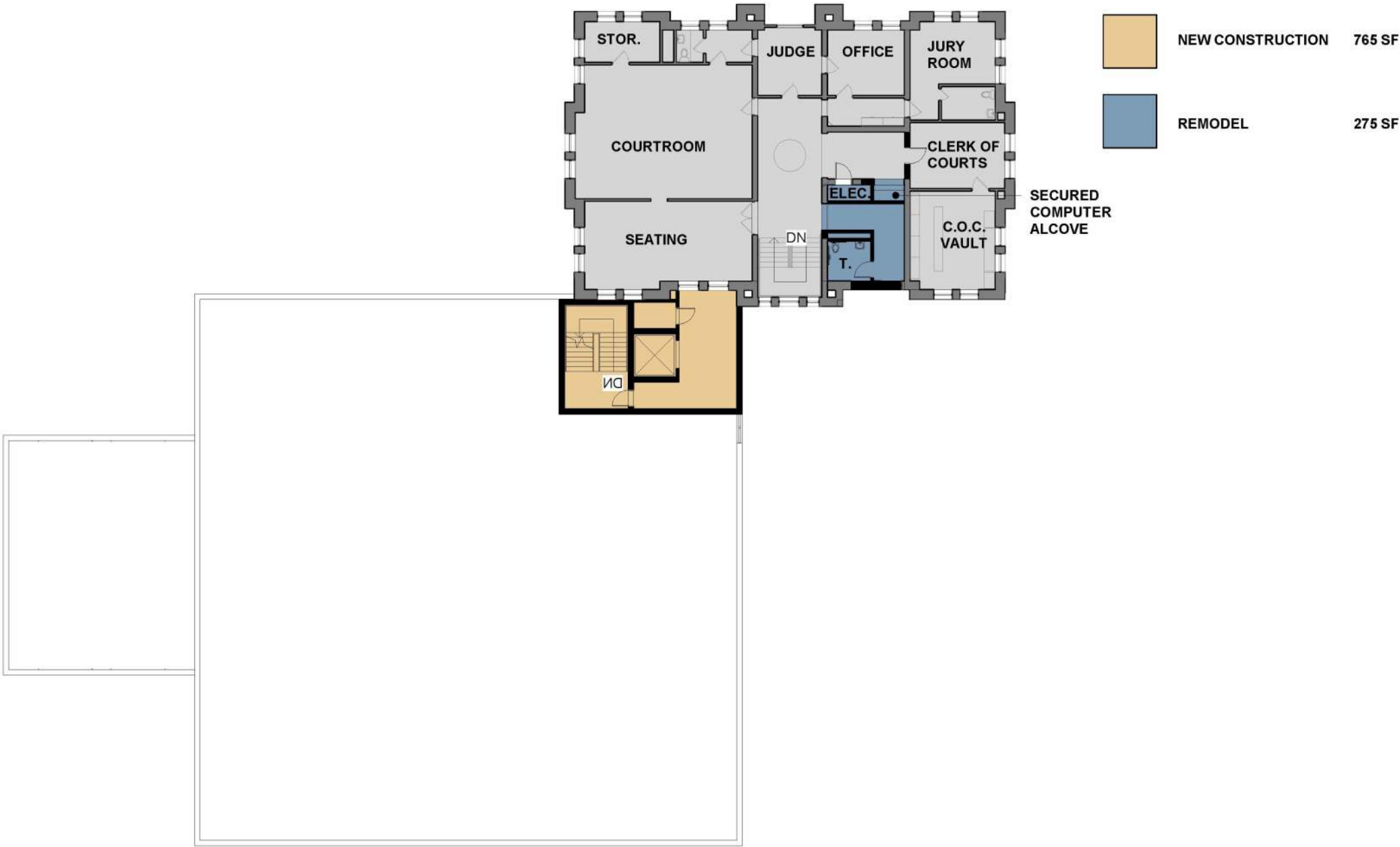
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Sheet Number SD-03



CONCEPT THIRD FLOOR PLAN



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COURTHOUSE ADDITION  
BRITTON, SOUTH DAKOTA -  
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# Appendix

## THIRD PARTY MOLD TEST REPORT

September 13, 2020

Marshall Co. Court House  
P.O. Box 130  
Britton, SD 57430

Subj: IAQ/Limited Mold Testing Report  
Marshall Co. Court House  
911 Vander Horck  
Britton, SD  
GeoTek #20-E88

Ms. Megan Biel;

GeoTek performed an indoor air quality (IAQ) site assessment for mold at the referenced location on September 2, 2020. Testing was performed to assess airborne mold and avian pathogen levels in the county courthouse.

Thank you for contacting GeoTek regarding indoor air quality testing on this project, we appreciate your business. If you have any questions or if we may be of further assistance, please give us a call at 605/335-5512.

**GEOTEK ENGINEERING & TESTING SERVICES, INC.**



Katherine Howard  
Project Manager

**INDOOR AIR QUALITY  
LIMITED MOLD TESTING**

**Site:**

**Marshall County Court House  
911 Vander Horck  
Britton, SD**

**GeoTek #20-E88-4**

**Prepared by:**

**Katherine Howard – Project Manager/Staff Scientist  
GeoTek Engineering & Testing Services, Inc.  
909 East 50<sup>th</sup> Street North  
Sioux Falls SD 57104**

**Tested: September 2, 2020**



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911 Vander Horck, Britton, SD  
Tested September 2, 2020

Page 1 of 8  
GeoTek No: 20-B47-4

## EXECUTIVE SUMMARY

GeoTek performed an indoor air quality (IAQ) site assessment and limited testing for mold at the referenced project site on September 2, 2020. Testing was performed to assess airborne mold and avian pathogen levels in the county courthouse.

Airborne mold levels were found to be normal in the areas tested. Visible mold was not observed.

Avian pathogen testing showed a detection of *Chlamydophila psittaci* below the amount that can be accurately quantified in both attic and basement samples. *Cryptococcus neoformans* and *Histoplasma capsulatum* were not detected.

Indoor air quality parameters measured during our site visit (CO<sub>2</sub>, RH, CO, Temp.) did not indicate levels outside of ASHRAE (American Society of Heating, Refrigerating & Air Conditioning Engineers) guidelines.

## 1.0 INTRODUCTION

### 1.1 Purpose of Work

The purpose of this work was to complete an indoor air quality (IAQ) site assessment and limited mold testing at the referenced project site. Testing was performed to assess airborne mold and avian pathogen levels in the county courthouse.

## 2.0 BACKGROUND INFORMATION

### 2.1 Site Description/History

The structure is three story, brick building with a large attic and a basement used for paper storage and maintenance areas. Ms. Biel reported that there has been a bat infestation problem in the attic and basement for years. There is some occasional water intrusion in the maintenance area of the basement as well as dripping condensation from some of the air conditioning pipes during the summer months.

## 3.0 ASSESSMENT RESULTS

### 3.1 Observations

A GeoTek Staff Scientist, Katherine Howard, arrived on site Wednesday, September 2, 2020 at approximately 10:00 am. Airborne mold samples were collected in several areas of the basement. One sample was collected in the third floor court room and two samples were collected on the attic level in the evidence room and the main attic area. An exterior sample was collected for comparison. Two avian pathogen air samples were collected. One was collected in the main room of the basement and one in the main attic room. Bat droppings were present.

911 Vander Horck, Britton, SD  
Tested September 2, 2020

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GeoTek No: 20-B47-4

### 3.2 QTRAK Instrument Readings

It is standard procedure for GeoTek to include QTRAK readings for IAQ assessments. The QTRAK meter (TSI, Inc.) records air measurements including carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), relative humidity (%RH) and temperature (°F).

Locations	CO <sub>2</sub> (ppm)	Temperature (°F)	Relative Humidity (%)	CO (ppm)
Basement – Records Room	645	75.8°	49.1	0.0
Basement – Evidence Room	648	76.0°	50.7	0.0
Basement – Maintenance Room	739	75.8°	46.2	0.0
3 <sup>rd</sup> Floor – Court Room	843	74.3°	48.6	0.0
Attic – Main Room	1026	73.1°	50.8	0.0
Attic – Evidence Room	832	72.3°	49.2	0.0
Outside – South	330	76.7°	42.3	0.0
<b>Guidelines</b>	<b>&lt;1000</b>	<b>68-76 F *</b>	<b>30-50% 20-30%**</b>	<b>&lt;9</b>

\* = ASHRAE guideline based on body odors and comfort in offices.

\*\* = To minimize moisture, keep %RH between 20-30% in winter and below 50% in summer.

**Carbon dioxide (CO<sub>2</sub>)** is produced as people breathe in oxygen and exhale CO<sub>2</sub>. It is often used as a crude indicator of ventilation. Normal well-ventilated rooms usually have about 700-900 ppm CO<sub>2</sub> with people present while poorly ventilated rooms may exceed 1000-1500 ppm CO<sub>2</sub>. Outside air is usually about 350-450 ppm. The American Society of Heating, Refrigeration, and Air conditioning Engineers (1997) recommends a maximum of 1000 ppm CO<sub>2</sub>. Complaints may increase when concentrations exceed 1000-2000 ppm CO<sub>2</sub>. High CO<sub>2</sub> levels sometimes suggest insufficient ventilation (lack of fresh, outside air). This may contribute to headaches, fatigue, and reduced productivity. However, severe health effects are not related to carbon dioxide below 5000 ppm (OSHA limit). **Carbon dioxide readings were within the recommended guidelines in the areas tested. The attic main room was at the top of the acceptable range.**

**Carbon monoxide (CO)** is a gas given off due to incomplete combustion. Sources include furnaces, vehicles, kerosene, gas water heaters, etc. The current OSHA permissible exposure limit (PEL) is 50 ppm as an 8-hour exposure for industrial workers. Average levels in homes without gas stoves vary from 0.5 to 5 ppm. CO limits the absorption of oxygen into the bloodstream and can cause headaches and other symptoms. **Direct readings did not indicate the presence of CO at levels of concern in the areas tested.**

**Temperature (°F)** measures air temperature. For office workers, ASHRAE (1992) suggests 68-75 °F in winter and 73-76 °F in summer. **Temperature is often based on occupant comfort.**

**Relative humidity (%RH)** is a measure of moisture in the air. Moisture levels in excess of 60-70% feel uncomfortable and may promote mold growth. To reduce microbiological growth, relative humidity should be kept below 50% during warm months and below 30% in colder



911 Vander Horck, Britton, SD  
Tested September 2, 2020

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GeoTek No: 20-B47-4

months. Relative humidity usually should not be reduced below 20% in the winter. Health complaints occur much more frequently when below 30% RH and especially below 20% RH (Godish, 1995, p.56; ASHRAE, 1997, p.8.12). This can include static electricity problems to equipment, and eye and respiratory system irritations (ASHRAE, 2000, p. S20-2). **The relative humidity readings were within the recommended guidelines in the areas tested. The basement evidence room and the attic main room were at the top of the acceptable range.**

#### 4.0 LABORATORY TEST RESULTS

Mold testing methods include: (1) visible mold, and (2) airborne mold. Both methods are useful and provide supporting information. Sampling results are attached in Appendix A with major genera summarized in Table 1. See Appendices B, C, D & E for mold testing options and methods, mold exposure guidelines, and general suggestions for reducing mold concerns.

##### 4.1. Visible Mold

Visible mold was not observed. Below is some information on visible mold.

Some molds such as *Alternaria* and *Cladosporium* are often considered nonproblem indicating molds that can live in moist conditions and do not always indicate a concern. *Aspergillus*, *Penicillium* and *Scopulariopsis* can survive in dry to moist conditions and are very common, however, their presence at elevated airborne levels is often considered a problem indicator. They are allergen molds and are sometimes of concern. The presence of some molds such as *Bispora*, *Phialophora*, and *Taeniolella* are indicative of wood rot. Slight amounts of visible mold do not necessarily indicate a problem exists. However, large amounts of any visible mold may be cause for concern.

Common mycotoxin producing fungi that are present in water-damaged buildings and building systems include species of *Alternaria*, *Aspergillus*, *Chaetomium*, *Memmoniella*, *Paecilomyces*, *Penicillium*, *Phoma*, *Stachybotrys*, and *Trichoderma*. Environmental conditions, such as temperature, humidity, climate, and growing substrate significantly influence whether mycotoxins are produced or not. Slight amounts of some of these molds are not uncommon (EML Laboratories, Shelton, et.al., 2002). Many visible molds are not a concern unless disturbed. Cleaning, remodeling, demolition, etc., may stir up visible molds and produce high airborne levels.

##### 4.2 Airborne Mold Testing

A total of 7 airborne samples for nonviable (not cultured) mold were collected. Non-viable mold includes both living and dead mold collected in a cassette and identified under a microscope (not cultured). Data is reported in spores per cubic meter of air (spores/m<sup>3</sup>). Tests were taken using Allergenco cassettes at a calibrated flow rate of 15 liters/minute for 5 minutes each.

GeoTek Engineering & Testing Services, Inc.

911 Vander Horck, Britton, SD  
Tested September 2, 2020

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GeoTek No: 20-B47-4

#### 4.2.1 Non-Viable Mold – General

Non-viable mold data for major molds are shown in Table 1. (See also lab analyses in Appendix A.) Non-viable mold includes both living and dead mold collected in a cassette and identified under a microscope (not cultured). Non-viable tests provide less accurate identification of specific molds but often provide a good indication of total mold. Both living and dead molds can be allergens and produce mycotoxins.

Normal non-viable mold levels for non-problem buildings are typically in the range of 500 to 3000 spores/m<sup>3</sup>. Higher levels may sometimes occur. This does not always indicate a problem exists, especially if airborne levels are higher outside. In non-problem buildings, mold levels are typically higher outside than inside (not always true in the winter months when temperature, weather, and ground cover can be a factor).

Indoor spore levels usually average 30-80% of the outdoor spore level at the time of sampling, with the same general distribution of spore types. Filtered air, air-conditioned air or air remote from outside sources may average 5-15% of the outside air at the time of sampling. (These percentages are guidelines only. A major factor is the accessibility of outdoor air. A residence with open doors and windows and heavy foot traffic may average 95% of the outdoor level while high rise office buildings with little air exchange may average 2%. Dusty interiors may exceed 100% of the outdoors to some degree, but will still mirror the outdoor distribution of spore types).

In warmer months, the moist mold *Cladosporium* (often considered a non-problem mold at low levels) is usually the most common mold both inside and outside in non-problem buildings. During winter months, the common molds, *Aspergillus* and *Penicillium*, may show increases. These molds tolerate drier conditions and may become more common in the winter months inside. They are considered problem indicators at higher levels (>1000-2000 spores/m<sup>3</sup>) or where they are the dominant mold present. The tiny spores for these two molds look alike in non-viable tests and are typically reported together as *Pen/Asp* or *Asp/Pen*.

Some molds that grow in very moist to wet conditions are considered problem indicators even at low levels. This may include *Stachybotrys*, *Trichoderma*, *Memmoniella*, *Chaetomium* and others. These molds produce mycotoxins and may be harmful to sensitive individuals. They are often poorly detected in airborne samples unless active disturbance (remodeling, etc.) is occurring.

#### 4.2.2 Non-Viable Mold – Test Results

A substantial increase of one or two spore types which are inconsistent with and non-reflective of the outside distribution of spore types is usually indicative of an indoor reservoir of mold growth. In Table 1 the key genera are used to evaluate mold levels.

GeoTek Engineering & Testing Services, Inc.

911 Vander Horck, Britton, SD  
Tested September 2, 2020

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GeoTek No: 20-B47-4

**TABLE 1 - Summary of Major Genera Non-Viable Airborne Mold Tests**

Sampling Location	Date	Total Mold (T=100%)	Cladosporium (%T)  Common Dominant Mold	Penicillium/Aspergillus (%T)  Moisture Indicator Mold	Chaetomium & Stachybotrys (%T) Wet Molds
Basement – Records Room	09/02/2020	160	<i>Not Detected</i>	<i>Not Detected</i>	<i>Not Detected</i>
Basement – Evidence Room	09/02/2020	1,332	160 (12%)	266 (20%)	<i>Not Detected</i>
Basement – Maintenance Room	09/02/2020	2,345	480 (20%)	480 (20%)	<i>Not Detected</i>
3 <sup>rd</sup> Floor – Court Room	09/02/2020	160	160 (100%)	<i>Not Detected</i>	<i>Not Detected</i>
Attic – Main Room	09/02/2020	1,544	640 (41%)	160 (10%)	53 (3%)
Attic – Evidence Room	09/02/2020	266	160 (60%)	<i>Not Detected</i>	<i>Not Detected</i>
Informal Rule of Thumb Normal (Non-Problem) Mold Levels Inside Buildings					
Upper Range Most Buildings		<2000-4000	<2000-3000	<1000-2000	<50-250
Upper Range with good Filtration		<1000-3000	<1000-2000	<500-1000	Not Detected

**Notes:** Percent (%T) is percent mold type versus total mold. **Bold** = Possible Concern. Levels also depend on outside conditions. > - Indicates spores too numerous to count. Values given are estimates for quantitation purposes. The screening levels are based on GeoTek's experience and published literature of mold levels exceeding normal background levels. This is not a formal guideline. Most persons will not experience noticeable symptoms at these levels while sensitive persons may experience symptoms below these levels. Higher levels may be required to cause noticeable health symptoms, especially for only short-term exposure (hours).

\* = Basements, tunnels, crawlspaces, and wall cavity samples often have higher mold levels than ambient airborne samples.

\*\* - Airborne sampling results showed spore types and levels consistent with outdoor air infiltration.

The **Outdoor – South** sample collected outside the building reported total mold levels at 9,437 spores/m<sup>3</sup>. The dominant mold was basidiospores observed at 3,040 spores/m<sup>3</sup> (32%). *Cladosporium* was observed at 2,773 spores/m<sup>3</sup> (29%). *Pen/Asp* was observed at 1,866 spores/m<sup>3</sup> (20%).

GeoTek Engineering & Testing Services, Inc.



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#### 4.3 Airborne Avian Pathogen Testing

Airborne avian pathogen samples were collected in a cassette and identified by PCR (polymerase chain reaction), a type of analysis used to identify the genetic material of the organism of interest. Data is reported in cell equivalents per cubic meter of air (CE/Unit). Tests were taken using 37 mm polycarbonate cassettes with 0.45  $\mu$ m filters at a calibrated flow rate of 15 liters/minute. Close faced sampling is used to obtain a minimum of 600 L (0.6 m<sup>3</sup>) of sample. A reference blank is also required.

Bacteria/fungus	Basement: Main Room	Attic: Main Room (East)
Sample Size	0.837 m <sup>3</sup>	0.91 m <sup>3</sup>
Chlamydomphila psittaci	1 CE** (1CE**/Unit)	1 CE** (1 CE**/Unit)
Cryptococcus neoformans	Not Detected (<119 CE/Unit)	Not Detected (<110 CE/Unit)
Histoplasma capsulatum*	Absent	Absent

\* - This organism requires a two-stage PCR method of analysis. As a result, detection can only be reported as "Present" or "Absent".

\*\* - Detection of Chlamydomphila psittaci was below the amount that can be accurately quantified. Provided value for informational purpose only.

Chlamydomphila psittaci infections are usually acquired from psittacine birds and cause respiratory disease in people. It can be acquired by handling infected animals and inhalation of dust containing fecal material. Most cases of human psittacosis have occurred persons who regularly handle birds such as staff members at a zoological gardens, and among pet store staff and visitors. Where the disease is present it is recommended to practice proper hand hygiene, including washing hands immediately upon exit of the animal area and before any hand-to mouth activity or eating is done. Practice proper hand hygiene after any contact with shoes, strollers, or clothing that might have come in contact with animals, their waste, or their bedding. Report any animal bites or injuries promptly to your doctor and authorities per local or state law. (<http://www.nasphv.org/Documents/AnimalContactCompendium2017.pdf>)

Laboratory results are attached in Appendix A.

#### 5.0 CONCLUSIONS/RECOMMENDATIONS

GeoTek performed Indoor Air Quality and Limited Mold Testing at the referenced project site on September 2, 2020.

Airborne mold levels were found to be normal in the areas tested. Visible mold was not observed.

GeoTek Engineering & Testing Services, Inc.

911 Vander Horck, Britton, SD  
Tested September 2, 2020

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Cryptococcus neoformans and Histoplasma capsulatum were not detected. However, avian pathogen testing showed a detection of Chlamydophila psittaci below the amount that can be accurately quantified in both attic and basement samples. Since considerable amounts of feces were present in the attic it is recommended to limit access to that area and have it cleaned on a regular basis. Experienced bio hazard cleaners should be used to clean the attic area.

Small animal feces were also observed in the basement to a lesser extent but the basement area is in greater use. Regular cleaning of the basement should also be performed by maintenance workers with proper protective gear weekly or whenever animal droppings are observed.

Anyone entering the basement and attic areas should be informed to use proper personal hand hygiene.

Relative humidity was above the recommended ASHRAE guidelines in the areas tested.

Indoor air quality parameters measured during our site visit (CO<sub>2</sub>, RH, CO, Temp.) did not indicate levels outside of ASHRAE (American Society of Heating, Refrigerating & Air Conditioning Engineers) guidelines.

#### **6.0 STANDARD OF CARE**

The services performed by GeoTek Engineering & Testing Services, Inc., (GeoTek) on this project have been conducted with that level of care and skill ordinarily exercised by reputable members of the profession, practicing in the same locality under similar budget and time constraints. No other warranty is expressed or implied.

We emphasize mold testing methods have many limitations, especially short-term testing based on limited sampling (Burge, 1995, 2000). The presence or absence of indoor air quality mold related hazards applies only to tested or assessed areas on the date of the field visit and that conditions may change due to deterioration or maintenance. Ongoing monitoring by the owner or facility is usually necessary. This survey is not intended to represent an exhaustive research of all potential hazards or conditions, which may exist. Mold present in concealed areas of the building not exposed to the general ventilation, such as wall cavities, may not be detected by airborne testing.

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GeoTek Engineering & Testing Services, Inc.

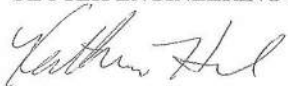
911 Vander Horck, Britton, SD  
Tested September 2, 2020

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GeoTek No: 20-B47-4

#### 7.0 REMARKS

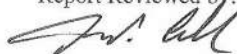
We appreciate the opportunity to be of service to you on this project. Please let us know if you have any questions or if we may be of further assistance.

#### GEOTEK ENGINEERING & TESTING SERVICES, INC.



Katherine Howard  
Project Manager  
Staff Scientist

Report Reviewed by:



Jason Cook  
Certified Industrial Hygienist  
Senior Project Manager

---

GeoTek Engineering & Testing Services, Inc.

**GEOTEK APPENDIX A**  
**LABORATORY ANALYSES**



EMLab P&amp;K

## Report for:

Katherine Howard  
Geotek Engineering & Testing Services, Inc.  
909 East 50th St. North  
Sioux Falls, SD 57104

Regarding: Project: 20-E88; Marshall Co. Courthouse  
EML ID: 2475172

## Approved by:

Dates of Analysis:  
PCR screen: Avian Pathogen: 09-10-2020

A handwritten signature in black ink that reads "Joshua T. Cox".

Operations Manager  
Joshua Cox

Service SOPs: PCR screen: Avian Pathogen (EM-BC-S-1097, EM-BS-S-1199 & EM-BC-S1206)

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received.

Eurofins EMLab P&K ("the Company") shall have no liability to the client or the client's customer with respect to decisions or recommendations made, actions taken or courses of conduct implemented by either the client or the client's customer as a result of or based upon the Test Results. In no event shall the Company be liable to the client with respect to the Test Results except for the Company's own willful misconduct or gross negligence nor shall the Company be liable for incidental or consequential damages or lost profits or revenues to the fullest extent such liability may be disclaimed by law, even if the Company has been advised of the possibility of such damages, lost profits or lost revenues. In no event shall the Company's liability with respect to the Test Results exceed the amount paid to the Company by the client therefor.

Aerotech Laboratories, Inc.

EMLab ID: 2475172, Page 1 of 2



**Eurofins EMLab P&K**

1501 West Knudsen Drive, Phoenix, AZ 85027  
(800) 651-4802 Fax (623) 780-7695 www.emlab.com

Client: Geotek Engineering & Testing Services, Inc. Date of Sampling: 09-02-2020  
C/O: Katherine Howard Date of Receipt: 09-03-2020  
Re: 20-E88; Marshall Co. Courthouse Date of Report: 09-11-2020

**AVIAN PATHOGEN SCREEN: PCR METHODOLOGY**

Location:	Basement: Main Room		Attic: Attis Eas		Blank: Reference Blank	
Comments (see below)	A		A		None	
Sample Type:	Polycarbonate Air Filter Cassette		Polycarbonate Air Filter Cassette		Polycarbonate Air Filter Cassette	
Lab ID-Version†:	11798152-1		11798153-1		11798154-1	
Sample Size:	0.837		0.91		1	
Unit:	m3		m3		sample	
	CE*	CE*/Unit	CE*	CE*/Unit	CE*	CE*/Unit
<i>Chlamydomydia psittaci</i>	1	1	1	1	ND	<100
<i>Cryptococcus neoformans</i>	ND	<119	ND	<110	ND	<100
<i>Histoplasma capsulatum</i> §	Absent		Absent		Absent	

\*Cell equivalents ND = Not Detected

**Comments:** A) Detection of *Chlamydomydia psittaci* was below the amount that can be accurately quantified. Provided value for informational purpose only.

Method Reference: *Chlamydomydia psittaci*- Madico, G., Quinn T.C., Boman, J., and Gaydos C.A. 2000. Touchdown enzyme time release-PCR for detection and identification of *Chlamydia trachomatis*, *C. pneumoniae*, and *C. psittaci* using the 16S and 16S-23S spacer rRNA genes. J. Clin. Microbiol. Vol. 38. 1085-1093

Method Reference: *Cryptococcus neoformans*- Bialek, R., Weiss, M., Bekure-Nemariam, K., Najvar, L.K., Alberdi, M.B., Graybill, J.R., and U. Reischl. 2002. Detection of *Cryptococcus neoformans* DNA in tissue samples by nested and real-time PCR assays. Clin Diagn Lab Immunol. 9:461-469

Method Reference: *Histoplasma capsulatum*- Reid, T.M. and Schafer, M.P., 1999. Direct detection of *Histoplasma capsulatum* in soil suspensions by two-stage PCR. Mol Cell Probes. 13(4):269-73.

§This organism requires a two-stage PCR method of analysis. As a result, detection can only be reported as "Present" or "Absent".

†A "Version" indicated by "-x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

Aerotech Laboratories, Inc.

EMLab ID: 2475172, Page 2 of 2



GEOTEK ENGINEERING  
& TESTING SERVICES, INC.  
909 EAST 50<sup>TH</sup> STREET NORTH  
SIOUX FALLS, SD 57104  
605-335-5512 FAX 605-335-0773

NONE		FOG		RAIN		SNOW		WIND		CLOUDY		REQUESTED SERVICES (✓ BOXES)	
LIGHT												NON-CULTURABLE	
MODERATE												TAPE SWAB	
HEAVY												SPORE TRAP	
												BULK	
												OTHER	
<p>CLIENT: Marshall Co. Courthouse CONTACT: Megan Biel - Auditor</p> <p>ADDRESS: P.O. Box 130 PHONE NO.: 605-548-2401</p> <p>Britten, SD 57430 E-MAIL: mc.auditor@vanaturecomm.net</p>													
<p>PROJECT: Courthouse</p> <p>PROJECT ADDRESS: 911 Vander Horck</p> <p>PROJECT CITY, STATE: Britton, SD</p> <p>SAMPLING DATE: 9-2-20</p> <p>PO NUMBER: 70-E88</p>													
<p>TURN AROUND TIME CODES</p> <p>STD - STANDARD (DEFAULT)</p> <p>SD - SAME BUSINESS DAY</p> <p>ND - NEXT BUSINESS DAY</p> <p>2D - TWO BUSINESS DAY</p>													
SAMPLE ID	CASSETTE ID	DESCRIPTION	SAMPLE TYPE (BELOW)	PUMP CAL (L/MIN)	SAMPLE TIME (MIN)	NOTES (TIME OF DAY, TEMP, RH, ETC.)	Fungi - Spore Trap Analysis	Fungi - Direct Microscopic Exam	Describe:				
1	4203231	Basement - Record Rm		15 L/min	5m								
2	4203232	" - Evidence Rm											
3	4203227	" - Maintenance Rm											
4	4203340	3rd Fl - Court Room											
5	4203237	Attic - Main Room											
6	4203249	Attic - Evidence Room											
7	4203239	Outside - South											
8													
9													
10													
<p>SAMPLE TYPE CODES</p> <p>ST - SPORE TRAP; ZEFON ALLERGENCO, BURKARD, ...</p> <p>SAS - SURFACE AIR SYS</p> <p>O - OTHER</p>													
<p>RELINQUISHED BY</p> <p>DATE &amp; TIME</p> <p>RECEIVED BY</p> <p>DATE &amp; TIME</p>													
<p>DATE &amp; TIME</p> <p>9-2-20</p>													

GeoTek Engineering Testing Services, Inc.  
909 East 50th Street North, Sioux Falls, SD 57104  
(605) 335-5512 Fax (605) 335-0773

Client: Marshall Co. Courthouse  
P.O. Box 130  
Britton, SD 57430

Site: Marshall Co. Courthouse  
911 Vander Horck  
Britton, SD

Date of Sampling: 09/2/2020  
Date of Received: 09/2/2020  
Date of Analysis: 09/4/8/2020

GeoTek#: 20-E88-4  
Analyst: Katherine Howard

Analyst Signature: 

**SPORE TRAP REPORT: NON-VIABLE METHODOLOGY ASTM D7391**

Location:	Basement - Records Room				Basement - Evidence Room				Basement - Maintenance Room				3rd Floor - Court Room			
Lab ID:	#1 20-E88-#4203231				#2 20-E88-#4203232				#3 20-E88-#4203227				#4 20-E88-#4203342			
Standard Slide Identification	1000x - 25%				1000x - 25%				1000x - 25%				1000x - 25%			
	Raw ct.	Spores/m <sup>3</sup>	DL/m <sup>3</sup>	%	Raw ct.	Spores/m <sup>3</sup>	DL/m <sup>3</sup>	%	Raw ct.	Spores/m <sup>3</sup>	DL/m <sup>3</sup>	%	Raw ct.	Spores/m <sup>3</sup>	DL/m <sup>3</sup>	%
Alternaria																
Ascomycetes*									22	1,173	53	50				
Basidiospores*	3	160	53	100	15	800	53	60	2	106	53	5				
Cercospora																
Chaetomium																
Cladosporium					3	160	53	12	9	480	53	20	3	160	53	100
Curvularia																
Drechslera/Bipolaris type																
Epitocum																
Fusarium																
Nigrospora																
Oidium																
Penicillium/Aspergillus**					5	266	53	20	9	480	53	20				
Pithomyces									1	53	53	2				
Rusts																
Smuts, Periconia, Myxomycetes									1	53	53	2				
Stachybotrys/Merionetiella																
Taeniella					2	106	53	8								
Ulocladium																
Unknown, Other																
Pollen																
Background debris (1-4+)	1+				2+				4+							
Sample volume (liters)	75				75				75				75			
<b>TOTAL SPORES/M3</b>		160	53	100		1,332	53	100		2,345	53	100		160	53	100

\* Most of these spore types are not seen with culturable methods. Most of the ascomycetes and basidiospores are "mushroom" spores while the rusts and smuts are plant pathogens.

\*\*The spores of Aspergillus and Penicillium are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.

\*\*\*Background debris (graded from 1+ to 4+, indicating the largest amounts) is an indication of the amount of non-biological particulate matter present on the slide (dust in the air).

The Limit of Detection is the product of a raw count of 1 and 100 divided by the percent read. The analytical sensitivity (DL/m<sup>3</sup>) is the product of the Limit of Detection and 1000 divided by the sample volume.



**GeoTek Engineering Testing Services, Inc.**  
909 East 50th Street North, Sioux Falls, SD 57104  
(605) 335-5512 Fax (605) 335-0773

Client: Marshall Co. Courthouse  
P.O. Box 130  
Britton, SD 57430

Site: Marshall Co. Courthouse  
911 Vander Horck  
Britton, SD

Date of Sampling: 09/2/2020  
Date of Received: 09/2/2020  
Date of Analysis: 09/4/2020

Geotek#: 20-E88-4  
Analyst: Katherine Howard

Analyst Signature: 

**SPORE TRAP REPORT: NON-VIABLE METHODOLOGY ASTM D7391**

Location:	Attic - Main Room				Attic - Evidence Room				Outside - South			
Lab ID:	#5 20-E88-#4203237				#6 20-E88-#4203249				#7 20-E88-#4203239			
Standard Slide Identification	Raw ct.	Spores/m <sup>3</sup>	DL/m <sup>3</sup>	%	Raw ct.	Spores/m <sup>3</sup>	DL/m <sup>3</sup>	%	Raw ct.	Spores/m <sup>3</sup>	DL/m <sup>3</sup>	%
		1000x - 25%				1000x - 25%				1000x - 25%		
Alternaria	2	106	53	7					2	106	53	1
Ascomycetes*	2	106	53	7	1	53	53	20	28	1,493	53	16
Basidiospores*	7	373	53	24					57	3,040	53	32
Cercospora									1	53	53	1
Chaetomium	1	53	53	3								
Cladosporium	12	640	53	41	3	160	53	60	52	2,773	53	29
Curvularia												
Drechslera/Bipolaris type												
Epitococcus					1	53	53	20				
Fusarium												
Nigrospora												
Oidium												
Penicillium/Aspergillus**	3	160	53	10					35	1,866	53	20
Phycomycetes												
Rusts												
Smuts, Periconia, Myxomycetes	2	106	53	7					2	106	53	1
Stachybotrys/Memnoniella												
Taeniella												
Ulocladium												
Unknown, Other												
Pollen									Present			
Background debris (1-4+)	2+				2+				3+			
Sample volume (liters)	75				75				75			
<b>TOTAL SPORES/M3</b>		1,544	53	100		266	53	100		9,437	53	100

\* Most of these spore types are not seen with culturable methods. Most of the ascomycetes and basidiospores are "mushroom" spores while the rusts and smuts are plant pathogens.

\*\* The spores of Aspergillus and Penicillium are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.

\*\* Background debris (graded from 1+ to 4+) indicating the largest amounts) is an indication of the amount of non-biological particulate matter present on the slide (dust in the air). The Limit of Detection is the product of a raw count of 1 and 100 divided by the percent read. The analytical sensitivity (DL/m<sup>3</sup>) is the product of the Limit of Detection and 1000 divided by the sample volume.

GeoTek Engineering Testing Services, Inc.  
909 East 50th Street North, Sioux Falls, SD 57104  
(605) 335-5512 Fax (605) 335-0773

TABLE 1 - Sample Evaluation

Summary of Major Genera Non-Viable Airborne Mold Tests  
Marshall Co. Courthouse  
911 Vander Horck  
Britton, SD

Units in Spores/m<sup>3</sup>

Sampling Location	Date	Total Mold (T=100%)	Cladosporium (%T)	Common Dominant Mold	Penicillium Aspergillus (%T)	Chaetomium & Stachybotrys (%T)
Basement - Records Room	09/2/2020	160	Not Detected	Moisture Indicator Mold	Not Detected	Wet Molds
Basement - Evidence Room	09/2/2020	1,332	160 12 %	266 20 %	Not Detected	Not Detected
Basement - Maintenance Room	09/2/2020	2,345	480 20 %	480 20 %	Not Detected	Not Detected
3rd Floor - Court Room	09/2/2020	160	160 100 %	Not Detected	Not Detected	Not Detected
Attic - Main Room	09/2/2020	1,544	640 41 %	160 10 %	53 3 %	Not Detected
Attic - Evidence Room	09/2/2020	266	160 60 %	Not Detected	Not Detected	Not Detected
Outside - South	09/2/2020	9,437	2,773 29 %	1,866 20 %	Not Detected	Not Detected
Upper Range Most Building		<2000 - 4000	<2000 - 3000	<1000 - 2000	<50 - 250	
Upper Range with Good Filtration		<1000 - 3000	<1000 - 2000	<500 - 1000	Not Detected	

Notes: Percent (%T) is percent mold type versus total mold. Bold = Possible Concern. Levels also depend on outside conditions. Cladosporium is typically dominant in non-problem buildings.

Aspergillus/Penicillium are often the dominant molds in problem buildings. Chaetomium or Stachybotrys are considered wet, problem mold indicators. The levels used above are a general screening indicator based on GeoTek's experience and published literature of mold levels exceeding normal background levels. This is not a formal guideline. Most persons will not experience noticeable symptoms at these levels while sensitive persons may experience symptoms below these levels. Higher levels may be required to cause noticeable health symptoms, especially for only short-term exposure.

\* = Basements, tunnels, crawlspaces, and wall cavity samples often have higher mold levels than ambient airborne samples.

\*\* = Spore types and levels are consistent with outdoor air infiltration.

**NORMAL SPORE LEVELS:** Indoor spore levels usually average 30-80% of the outdoor spore level at the time of sampling, with the same general distribution of spore types. Filtered air, air-conditioned air or air remote from outside sources may average 5-15% of the outside air at the time of sampling. (These percentages are guidelines only. A major factor is the accessibility of outdoor air. A residence with open doors and windows and heavy foot traffic may average 95% of the outdoor level while high rise office buildings with little air exchange may average 2%. Dusty interiors may exceed 100% of the outdoors to some degree, but will still mirror the outdoor distribution of spore types).

**PROBLEM INTERIORS:** A substantial increase of one or two spore types which are inconsistent with and non-reflective of the outside distribution of spore types is usually indicative of an indoor reservoir of mold growth.



## GEOTEK APPENDIX B MOLD TESTING METHODS

This appendix addresses normal mold sampling methods used by GeoTek. Mold problems are not always obvious. The absence of visible mold does not mean a problem does not exist. Mold can grow out of sight behind walls and in ductwork. Airborne testing is often needed to identify if a problem exists. Airborne tests are also useful for before and after testing of clean-ups.

There are two common mold sample types, Tape/Bulk and Airborne.

### **Tape/Bulk Mold Tests**

Samples of visible mold can be collected by lifting it from a surface with clear (not frosted) scotch tape. The exposed tape is then placed (sticky side down) onto a new glass microscope slide. The slide is labeled with location, date and other information. The tape sample is then observed with a microscope (400-1000x). Small bulk samples may also be collected in plastic bags for direct microscopic examination.

### **Airborne Mold Tests**

There are two common types of airborne mold tests, Viable and Non-Viable mold.

**Viable** (culturable) methods collect air samples on culture plates. Samples are grown for 1-2 weeks on various types of growth media (petri plates). Samples are collected from individual growth colonies and placed under a microscope. This method provides more accurate identification of specific molds (growth structures). But, mold growth is dependent on the type of growth media and may molds do not grow on the media chosen. This method usually detects only a fraction of the total mold present and quickly becomes overloaded at higher levels. Note: home test kits based on settle (gravity) culture plates are not considered reliable. Both viable and non-viable tests are often preferred when legal concerns are involved.

**Non-Viable** tests collect both living and dead molds onto a sticky plate inside a plastic cartridge or cassette (Air-O-Cell). The sticky plate is observed with a microscope (400-1000x). This method allows for quicker analysis than viable tests (because there is no culture period) but is less effective at identifying specific mold species as only the spores (not growth structures) are usually detected. This method does not work as well in the cold (plate becomes less sticky). The non-viable method provides a good way to measure the total amount of airborne mold present. This method can detect some mold (such as *Stachybotrys*) better than the viable method and can detect much higher levels than the viable method. Non-viable tests are the predominate test method for airborne mold.

Standard non-viable airborne tests are collected as follows. An Air-O-Cell cassette is attached to a high volume air pump calibrated to a flow rate of 15 liters/minute. The typical sampling period is 5 minutes. For very moldy environments, this may be reduced to 1 or 2 minutes. The air sample is taken about 2-4 ft above the floor. Typically, a few samples are collected from the building interior and one outside air sample is collected. Emphasis is placed on problem areas, crawlspaces, and basements.

In-wall non-viable tests are collected as follows. Mold tests inside walls are typically taken by removing the faceplate off an electric outlet and placing a plastic cone over the outlet. Using an Air-O-Cell cassette and air pump, a sample is collected for 1 minute at a flow rate of 15 liters/minute. Another method used is to make a small (1/4 inch) hole in the wall and insert a plastic tube connected to an Air-O-Cell cassette and air pump. This is often done in the space behind the baseboard just above the sill plate.

## GEOTEK APPENDIX C

### MOLD EXPOSURE – RULES OF THUMB AND GUIDELINES

There are no well accepted numerical guidelines for mold exposure. Some individuals are much more sensitive than others. Exposure to high mold doses over a prolonged period may cause sensitization (allergic reactions) in some. There is disagreement among the scientific community over some symptoms but there is growing consensus that damp and moldy buildings are often associated with increased health problems. Molds can vary greatly in toxicity even in the same species. Those most vulnerable include infants and children <2 yrs old, elderly, persons with severe allergies or asthma and persons with weakened immune systems (due to sickness or medical treatments). **Airborne exposure** is the main concern from mold.

#### Visible Mold

**Small amounts of visible mold (including problem molds) are not uncommon and do not necessarily indicate a problem exists.** However, large amounts of visible mold are considered a potential health risk and unacceptable in occupied buildings (Samson, 1994). The New York City Health Dept (2000) considers <10 square ft to be a small amount. See US EPA and NYCHD web pages

Small amounts of the common, often non-problem molds, *Alternaria* and *Cladosporium* are usually not considered a major concern (although large amounts of any mold may be). Some visible molds are considered problem indicators. Mycotoxin producing molds include *Alternaria*, *Aspergillus*, *Chaetomium*, *Paecilomyces*, *Penicillium*, *Phoma*, *Stachybotrys*, *Memnoniella*, *Trichoderma* and others. Many factors affect the amount of mycotoxins that may be produced by these molds. That is, mycotoxin levels may vary from site to site.

#### Evaluating the Results of Tape or Bulk Samples (from Aerotech P&K, 2004 – see their web page)

1. Determine whether the fungi are colonizing, growing, and amplifying and identify the fungus.
2. The presence of a few loose spores are considered as background dust deposits.
3. The presence of growth structures suggests colonization and growth but not amplification if spores are not produced.
4. The presence of growth structures and spores suggests growth and amplification.
5. The presence of spores does not necessarily indicate amplification. An unusual number of spores of the same kind may suggest contamination from sources nearby.
6. The degree of growth is described as: (note: trace spores are common and may not indicate a concern)
  - A. **Massive:** fungal structures cover the entire sample in more than one layer.
  - B. **Numerous:** one layer of fungal structures covers the entire view area.
  - C. **Many:** fungal structures cover 25% to near 90% of the viewing area.
  - D. **A few:** fungal structures are consistently detectable and countable, and cover up to 25% of the view area.
  - E. **A trace:** fungal structures are detectable when carefully examined by one analyst, but may be missed by another.
  - F. **No obvious fungal growth.**

#### Airborne Mold

Airborne mold levels can vary greatly from place to place and seasonally. Mold levels are typically lower in offices than in houses and often highest in basements and crawlspaces. **Remodeling or cleaning water damaged or moldy rooms may disturb mold and temporarily cause high airborne levels.**

There are general guides but no national recognized acceptable numerical exposure guidelines for exposure. In GeoTek's experience, many non-problem mold levels often do not exceed 2000-4000 spores/m<sup>3</sup>. However, health symptoms and mold problems appear to occur more frequently when mold levels exceed 5,000-10,000 spores/m<sup>3</sup>.

**Rules of Thumb – Airborne Tests - Non Problem Buildings:** (1). Total mold levels <2000-5000 spores/m<sup>3</sup>; (2) Inside levels are lower than outside levels (not true in winter); (3) Approximately the same molds are inside as well as outside; (4) *Cladosporium* is often the most dominant mold.

**Rules of Thumb – Airborne Tests - Problem Buildings:** (1) Total mold levels >5000-10,000 spores/m<sup>3</sup>. May be higher inside than outside (not true in winter); (2) Types of mold are different inside than outside with *Aspergillus* and *Penicillium* often being dominant; (3) *Aspergillus* and/or *Penicillium* levels often >5,000-10,000 spores/m<sup>3</sup>; (4) Noticeable levels (especially >500-1000 spores/m<sup>3</sup>) of wet, (often toxic), molds including *Chaetomium*, *Fusarium*, *Stachybotrys*, *Memnoniella*, and *Trichoderma*.

Informal Rule of Thumb Normal (Non-Problem) Mold Levels Inside Buildings (spores/m <sup>3</sup> )				
Type of Mold	Total Mold	Cladosporium	Asp-Pen	Stachybotrys
Upper Range Most Buildings	<2000-4000	<2000-3000	<1000-2000	<50-250
Upper Range with good Filtration	<1000-3000	<1000-2000	<500-1000	Not Detected

## GEOTEK APPENDIX D

### REDUCING MOLD CONCERNS - GENERAL SUGGESTIONS

These are general suggestions intended for homeowners and small businesses. The keys to minimizing mold include moisture and dust control. **Remodeling may cause very high airborne mold levels.**

1. Remove Visible Mold. Any visible mold should be removed quickly. If large amounts of visible mold are present, appropriate safety precautions should be followed and care should be taken to isolate the area being cleaned. See NYCHD (2000) and Morey (1999). Isolate area and avoid spreading mold around during removal. Use cleaning firms for large problems.
2. Clean Up Water Leaks Within 48 Hours. Water damage can rapidly lead to severe microbiologic growth (bacteria, mold) within a few days. Moisture meters, thermal meters can locate damp spots. Note: Proper drying may take several days.
3. Reduce Excessive Moisture. Relative humidity should be kept below 50% in summer and 35% in winter. Inexpensive relative humidity meters are available. Dehumidifiers are available in many forms, often with automatic controls. Relative humidity should not be reduced below 20%, as this will cause health and static electric problems.
4. Provide Good Drainage. Rain gutters and downspouts with extensions should drain water at least 3' away from building foundations. This includes sump pumps and other water sources. Avoid excessive watering.
5. Check Roofs for Leaks. Roofs, especially flat roofs, are prone to leaks. Check roofs after heavy rain storms and during spring snow melt. Repair small leaks promptly.
6. Check Basement and Crawlspace. Basements and crawlspaces (including steam tunnels) are often major moisture sources. Good drainage, appropriate waterproofing and vapor barriers should be utilized. Ventilation and/or use of dehumidifiers, HUMIDEX-type systems, etc. may be useful. Use ½ inch gap (capillary break) between concrete floors and sheetrock walls to avoid moisture wicking up into the sheetrock and growing behind the walls. Stiff foam insulation often preferable to fiberglass in basements. Avoid vinyl wallpaper on basement exterior walls.
7. Use Good Building Practices. Consider appropriate insulation, ventilation, vapor barriers, etc. See Lstiburek and Carmody (1994), Beall (1999), Bynum (2001), Kuball (1999). Avoid use of vinyl wallpaper on exterior walls.
8. Check HVAC Ventilation & Insulation. Carbon dioxide levels should not exceed the ASHRAE (1997) guideline of 1000 ppm. Many buildings are tightly sealed and may not provide sufficient outside air. Ventilation systems are often poorly maintained. See HVAC contractors. Consider installing an outside air intake if needed. Attic insulation should be R38 (at least 1 ft of fiberglass or cellulose insulation. Colder air conditioned rooms allow warm humid outside air to condense in attic in summer and vice versa in winter
9. Check Attic Ventilation. Buildings with a lack of attic ventilation may trap moisture. Bath and kitchen fans should be exhausted to the outside and not into the attic. Soffit vents are often plugged up with loose insulation.
10. Optimize HVAC Filtration. Use the most efficient filters available for your system. This includes pleated filters. Note: The HVAC system must be designed to accept high efficiency filters. See HVAC contractors.
11. Have HVAC Ductwork Cleaned. Professional cleaning firms can clean out HVAC systems & duct work.



## **GEOTEK APPENDIX E CLEANING UP MOLD**

### **WATER CLEAN-UPS - DO IT QUICK BUT DO IT RIGHT!**

Water leaks should be cleaned within 24-48 hours. Water wicks quickly into sheetrock and particleboard. Large amounts of mold growth usually take 1-2 weeks or more. Just removing standing water is not enough. Because of this, dehumidifiers are typically needed for several days. The baseboards should often be pulled back and small holes made in the walls to allow drying. Consider commercial cleaning firms for larger jobs.

### **LARGE MOLD CLEAN-UPS – DON'T STIR UP MOLD!**

The main health concern is airborne exposure to high mold levels. **Mold is often not a concern until disturbed.** Remodeling and clean-ups involving opening up walls (especially in basements) often disturb large amounts of mold. This can be a serious health concern. Use commercial cleaning firms for large jobs or rent their equipment and follow their advice.

The proposed area should be isolated from other rooms. Plastic sheeting can be placed over doors and HVAC registers. The room should be placed under negative air (blowing to the outside) or large air scrubbers (air filters) should be used. Respirators (N-95 dust masks or better) should be used.

Before starting clean-up, the cause of the moisture should be identified and corrected. Dehumidifiers should be used if needed to dry out the room. Remove porous moldy materials (sheetrock, particleboard) and bag immediately. Don't carry moldy materials through other rooms. Wipe off moldy non-porous materials (wood, plastic, metal, concrete). This should include the floor, walls and ceiling in the room. Disinfectants can be used but soapy water is often enough. Moldy wood can be sanded. Allow materials to dry. Antimicrobial paints or encapsulants (Bins, Kilz, Perma-White, polyurethane paint) can be used on some surfaces to reduce moisture and future mold growth.

For sheetrock in basements, cut a ½ inch gap (capillary break) between the bottom of the sheetrock and concrete floor to prevent future wicking. Or consider mold resistant materials (cement-fiber board, mold resistant sheetrock, etc). Foam insulation may be better in basements than fiberglass.

### **WHAT CAN BE CLEANED?**

Porous items such as wet sheetrock or particleboard may need to be removed. Clothes and rugs can often be cleaned. However, musty porous furniture and mattresses may need to be discarded. Hard (non-porous) materials can often just be wiped off with a damp cloth. This includes plastic, glass, metal, and wood objects.

Small mold spots can often be wiped off and cleaned with soapy water mixed with a little bleach (one part bleach to 10 parts water). Avoid use of strong chemicals and pure bleach. Check with a commercial cleaning firm for advice (mm3/05).

## GEOTEK APPENDIX F MOLD & WATER CLEANUP FIRMS

**BROOKINGS – Total Maintenance** 708 Main St., Brookings, SD, Ph. 605-692-6425 Fax 605-697-7788 Cell 690-6425 Contact: Sean Lesnar. Services: Mold & water clean-up. Carpet and duct cleaning.

**FAIRMONT, MINNESOTA – Indoor Technologies** 10 Forgotten Lake Rd. Fairmont, MN 56301. Ph. 507-238-9927. Cell: 507-399-9173 Contacts: Craig Diegnau Services: Mold & water clean-up, duct & carpet cleaning, etc. MOLD TESTING

**MITCHELL – Floor Tec Professional Cleaning Services** 119 Railroad Ave. W, Mitchell, SD 57301 Ph. 605-999-4055. Contact Thud Herman, mold & water clean-up, etc. MOLD TESTING

**NORFOLK, NEBRASKA – Service Master of Norfolk** 1118 Riverside Blvd., Norfolk, NE 68702. Ph. 402-379-0357. Services: Mold & water clean-up, duct & carpet cleaning, etc. MOLD TESTING

**RAPID CITY – Dyna-Kleen** 605 Florman St., Rapid City, SD 57701 Ph. 605-342-3993 Fax 605-341-0305 Contact: Gary Sorensen. Services: Mold & water clean-up, carpeting, etc.

**RAPID CITY, SIOUX FALLS. – L&L Insulation** PO Box 1258, Rapid City, SD 57709, Ph 800-378-4012, Fax 605-343-0936, Contact: Steve VenTeicher Services: Mold remediation, Lead-based paint abatement services.

**SIOUX CITY, IOWA – Service Master of Sooland**, 1905 A St., S. Sioux City, NE 68776. Ph 402-494-3188. Fax 402-494-5035. Contact Milan Johnson. Services: Mold remediation, water clean-up, etc. E-mail: milan.johnson@smsooland.com

**SIOUX FALLS – Best Choice Carpet Cleaning** 908 E Quail Run Cir., Sioux Falls, SD 57108. Ph. 605-334-0633 Contacts: for mold – Ryan Van Donge & Dan Grossman. Services: Mold remediation, water, clean-up, carpet/rug, duct cleaning; tile shower sealing cleaning. [www.siouxfallsbestchoice.com](http://www.siouxfallsbestchoice.com)

**SIOUX FALLS – InTek (Interior Technicians, Inc.)** 505 N. Harlem, PO Box 1670, Sioux Falls, SD 57101. Ph. 605-334-9716, 1-800-456-5004, fax 605-335-6786 Contacts: for mold – Gaylon Anderson or Chuck Schipper Services: Mold remediation, duct cleaning & inspections, water clean-up, infrared camera moisture scans

**SIOUX FALLS – Kelsey's Cleaning & Water Restoration** 1912 S Cardinal Dr., Sioux Falls, SD 57105, Ph. 605-360-1111, Mark Kelsey, Services: Mold remediation, water, flood restoration, cleaning services.

**SIOUX FALLS – Mustang Disaster Clean-Up** 1119 N Phillips Ave., Sioux Falls, SD 57104, Ph. 605-370-1990, Tracy Comp, Services: Mold remediation, duct cleaning, fire, smoke water, flood restoration, e-mail: [tracy@mustangdisastercleanup.com](mailto:tracy@mustangdisastercleanup.com) [www.mustangdisastercleanup.com](http://www.mustangdisastercleanup.com)

**SIOUX FALLS – Rainbow International**., 4607 N 4<sup>th</sup> Ave. Ph 605-271-1111. Contact: Joe Schwebach. Services: water, fire & smoke restoration and cleaning. E-mail: [joe.schwebach@mail.rainbowintl.com](mailto:joe.schwebach@mail.rainbowintl.com)

**SIOUX FALLS – ServiceMaster of Sioux Falls** 46998 Mindy St. Ste.A, Tea SD 57064. Ph. 605-338-9615. Fax 605-368-9769 Contacts: Jim Slater, Tim Schavee Services: Mold & water clean-up, duct & carpet cleaning, etc. MOLD TESTING  
e-mail: [tim@servicemastermidconetw.com](mailto:tim@servicemastermidconetw.com), [www.servicemastersf.com](http://www.servicemastersf.com)

**SIOUX FALLS – Servpro West Sioux Falls** 27063 Sunset Blvd., Ste. 105, Tea, SD 57064, Ph. 605-213-3303, Adam Birger, Services: Mold remediation, water, fire, storm restoration, duct cleaning, 24 hr cleaning services.  
e-mail: [office@servprowestsiouxfalls.com](mailto:office@servprowestsiouxfalls.com), [www.servprowestsiouxfalls.com](http://www.servprowestsiouxfalls.com)

**SIOUX FALLS – Total Cleaning** 2305 W. 50<sup>th</sup> St., Suite A, Sioux Falls, SD 57105. Cell 728-6832 Contact: Colonel Echols, Dave Edler. Services: Mold & water clean-up, duct & carpet cleaning, etc.

**SIOUX FALLS – Tougas Restoration** 2215 North Dr., Sioux Falls, SD 57104. Cell 838-0791 Contact: Mat Tougas. Services: Mold & water clean-up, fire & smoke cleaning, storm & wind damage etc. MOLD TESTING

**SIOUX FALLS – Ductbusters** ph. 605-371-3030, [www.ductbusters.com](http://www.ductbusters.com). Duct cleaning & other services.

**SPIRIT LAKE, IOWA – Steamway of Spirit Lake** 1509 Memphis Ave., Unit F, Spirit Lake, IA 51360. Ph. 712-336-2484 Contacts: Glenda Services: Mold & water clean-up, duct & carpet cleaning, etc. MOLD TESTING

**VERMILLION – Louie's Carpet Cleaning & Disaster Restoration** P.O. Box 461 Vermillion, SD 57069, ph. 605-624-2485. Services: Mold & water clean-up, duct & carpet cleaning, etc. MOLD TESTING

**WATERTOWN – Steam Brothers** PO Box 1941, Watertown, SD 57210. Ph. 800-657-5818. Fax 605-886-4210. Contact: Dan Lindner. Services: Mold & water clean-up, duct clean, carpet clean

**WATERTOWN – Service Master** PO Box 331, Watertown, SD 57201, Ph 605-886-6006, Contact: Brad Van Meter. E-mail: [gmwatertown@iw.net](mailto:gmwatertown@iw.net). Mold and water clean-up, duct clean, etc. MOLD TESTING

**YANKTON – Floor Tec Professional Cleaning Services** 186 Oak Hollow Lane, Yankton, SD 57078 Ph. 605-665-4839. Contact Tom Langdon, mold & water clean-up, etc. MOLD TESTING

**YANKTON – Service Master of Yankton** 1118 w. 9<sup>th</sup> St. Yankton, SD 57078 Ph. 605-665-7080. Contact Joe Kollars, mold & water clean-up, etc. MOLD TESTING

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# Glossary

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# Glossary

## TERMS + ACRONYMS

Word Acronym	Definition/Acronym
A/C	Air conditioning.
ADA	Americans with Disabilities Act.
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers. ASHRAE standards establish consensus for test methods and performance criteria. These include voluntary consensus standards for Method of Measurement or Test, Standard Design and Standard Practice. Consensus standards define minimum values or acceptable performance. ASHRAE is accredited by the American National Standards Institute (ANSI) and follows ANSI's requirements for due process and standards development.
BUR	Built up roof.
Casework	Casework is storage, shelving, and cabinetry, that can be purchase ready-made.
CIPC	Cast-in-place concrete.
CMU	Concrete Masonry Units.
Domestic Cold Water	Drinking water.
Egress	An exit out of a space, building, or parking lot.
EPDM	Ethylene propylene diene terpolymer rubber (EPDM).
Exposed (isolation) joints, Isolation joint	Allows movement to occur between a concrete slab and adjoining columns and walls of a building. Isolation joints are provided to separate new concrete from existing or adjacent construction, which might expand and contract differently or experience different soil settlement or other movement.
Façade	Exterior surface of a structure.
Fluorescent	Traditional lighting that often is in a tube. Known to be less efficient than LED.
Gypsum Board	A type of sheathing used for interior walls and ceilings, also known as sheetrock or drywall.
Hazardous Materials	Any item or agent (biological, chemical, radiological, and/or physical), which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors.

Word Acronym	Definition/Acronym
HVAC	Heating, Ventilation, and Air Conditioning.
Ingress	Entrance into a space, building, or parking lot.
LED	Light-emitting diode. Light bulb type that uses less energy and has a longer lifespan than incandescent lighting.
Life Safety	Construction, protection, and occupancy features necessary to minimize danger to life from the effects of fire, including smoke, heat, and toxic gases created during a fire. Life Safety Code and NFPA 101 are registered trademarks of NFPA. All or part of the NFPA's Life Safety Code are adopted as local regulations throughout the country.
MEP	Mechanical, electrical, and plumbing.
Millwork	Custom made cabinets, shelving, and storage.
Panic bar	The operational bar or paddle that when pushed against, opens a latching mechanism on an assembly referred to as panic hardware.
Parcel	A portion or area of land.
Sheet Flow	Flow that occurs overland in places where there are no defined channels, the flood water spreads out over a large area at a uniform depth. This is also referred to as overland flow.
Site Grading	Site grade is the slope and elevation of the soil around a building.
Topography	The detailed mapping or charting of the features of a land area.
Truncated domes	Truncated domes are tactile paving or a set of raised bumps on a pathway (sidewalk) or platform. Truncated domes alert visually impaired individuals of surface changes and other potential hazards.
Utilities	Services typically piped or wired onto the site from a city source. For example, electricity, gas, water, cable, and telephone services are considered utilities.
VCT	Vinyl Composition Tile. Typically used on floors.

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## EXPERTISE

Architecture  
Engineering  
Environmental  
Planning

## WORK

Commercial  
Education  
Energy  
Food + Industrial  
Government + Cultural  
Healthcare  
Housing  
Mining  
Public Works  
Sports + Recreation  
Transportation  
Water



Mankato, MN  
Minneapolis/St. Paul, MN  
Des Moines, IA  
Storm Lake, IA  
Waterloo, IA  
Green Bay, WI  
La Crosse, WI  
Sioux Falls, SD

*On January 12, 2017, ISG formally announced its transition of firm ownership to a 100% employee stock ownership plan (ESOP). As a multi-disciplinary firm that started 47+ years ago, ISG has since grown to be a Top 500 Design Firm as recognized by Engineering News-Record (ENR), a Zweig Group Hot Firm, and PSMJ Circle of Excellence recipient, illustrating the progressive increase in talent, expertise, and market share.*

