Final Report New Sharon City Hall Improvements

Designed for the City of New Sharon, Iowa 5/16/25







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Section I Executive Summary

We are pleased to present the final design report for the remodel of the New Sharon City Hall. This is a comprehensive project designed to consolidate multiple city services in one building while updating and preserving the building for generations to come. The City of New Sharon, Iowa, identified the need to consolidate their City Hall, the public library, and the police department into a single, updated facility. The goal was to modernize the existing two-story 120' x 40' building, originally constructed in 1901, while improving accessibility, increasing usable space, and enhancing public service delivery for the community. We are a group of University of Iowa Civil and Environmental students who have prepared this design report for The City of New Sharon.

Our team developed a comprehensive redesign that expands the facility's total functional area from approximately 3,000 square feet to 9,600 square feet, addressing ADA compliance, sustainability, and modern municipal needs. After presenting two full design alternatives, the New Sharon City Council selected Alternative 1 for its efficient spatial layout and clear division between public, administrative, and secure areas.



Figure 1. 1st Floor Interior Floor Plan

The first floor of the proposed design houses the city clerk offices, a dedicated front service desk, city council chambers, and the police department. The police station's relocation from a site seven blocks away will provide better office space with improved evidence storage. This move will also enhance security for the other offices in the building. Also included in the designs is a detached police garage on a nearby lot and a front window display that can be used for library displays, posting city council agendas, or community information.



Figure 2. Front Desk Rendering



Figure 3. Police Department Rendering

The second floor of the redesigned facility is fully dedicated to the New Sharon Public Library, expanding its space from 1,800 square feet to 4,800 square feet. This significant increase allows for improved organization and user experience, with clearly defined areas for children, juveniles, teens, and adults. Each area will have adequate space for bookshelves, seating, and other design considerations. The children's area includes an interactive play zone, while flexible seating throughout the library encourages longer visits and casual reading. The library's footprint within the municipal building also improves accessibility and visibility, encouraging more frequent use by community members of all ages.



Figure 4. 2nd Floor Interior Floor Plan

To support a wider range of educational and creative activities, the layout includes two enclosed study rooms, a makerspace with secure equipment storage, and a dedicated computer lab with printer access. Display areas are distributed throughout the space for showcasing themed book collections, craft projects, or seasonal features. A private office for the library director provides space for administrative work and oversight of the main entrance.

Along with layout renovations, the improvements will include the installation of a full fire sprinkler system to bring the building up to current life safety standards. This system will provide comprehensive fire protection throughout all three floors and will be supported by the upgraded water service line. Additionally, a new HVAC system will be installed to replace the aging mechanical infrastructure, ensuring consistent climate control, improved indoor air quality, and increased energy efficiency. These upgrades are essential for both occupant safety and long-term building performance.



Figure 5. West End of Library Space

Figure 6. East End of Library Space



In addition to interior upgrades, the project includes several critical improvements to the building's exterior that address both functional needs and long-term durability. One of the most essential changes is the replacement of sidewalks along the north and east sides of the facility. These new sidewalks are designed with a 1.5–3% slope to divert stormwater away from the building's foundation. Additional exterior restoration work includes tuck pointing of deteriorated masonry joints and skim coat patching to repair worn or damaged wall surfaces. Foundation repairs using a flowable mortar are also included to address the existing cracks. To support the building's upgraded plumbing and fire protection systems, new water and sewer service lines are recommended as part of the site utility improvements. The design also includes the replacement of all windows throughout the building. New energy-efficient units will allow more natural light into the space, reduce daytime electricity usage, and restore the appearance of the historic structure. The building façade will be restored where needed to maintain visual continuity, while also improving weather resistance and overall curb appeal.



Figure 7. Historic Building Exterior

The estimated total cost of the project is \$3.19 million, which includes a 20% contingency for unforeseen conditions and an 8% fee for engineering and administration services. The estimate also accounts for key upgrades such as window replacements, utility enhancements, ADA-compliant restroom design, the installation of a fire sprinkler system, and the construction of a new police garage. These costs were developed using RSMeans and Craftsman's National Construction Estimator references.

To proceed with this project, the next step would be to engage an architect to develop the final plans. It is important that the contract for architectural services includes a structural engineering subconsultant to thoroughly inspect for building integrity issues that our team may have missed.

The architect can develop a construction phasing plan that will allow the City Clerk's office to remain in the building during construction; however, this will add to the project cost. The most economical option is to temporarily relocate the City Clerk's office during construction.

This is an exciting project that meets existing critical needs while also positioning New Sharon's municipal services for a vibrant future. We wish you the very best with this project.



Figure 8. Improved City Hall Rendering

Section II Organization Qualifications and Experience

1. Organization and Design Team Description

We are a team of students from the University of Iowa enrolled in the capstone design class, working together to apply our knowledge and skills to a real-world engineering project. Our team is composed of Blake Hayden (program manager), Tommy Dillon, and Grant Caltrider, each of whom is specializing in different areas of Civil and Environmental Engineering. Each team member brings expertise in a specific field, ensuring a well-rounded and comprehensive design.

Section III Design Services

1. Project Scope

The goal of this project was to redesign and expand the existing New Sharon City Hall to house three essential municipal services—city clerk offices, police department, and public library—within a single, modernized facility. Over the course of the semester, our team coordinated with city officials to gather feedback and adjust our design in response to both functional needs and space limitations of the historic two-story building. The final design reflects the city's preference for our first alternative layout, but Alternative 2, also fully developed, provided a distinct design concept that prioritized spatial separation between departments and emphasized quiet zones in the library layout. Key elements included in the project are as follows:

- Full interior space planning for all three departments
- Police department with evidence storage, private offices, and a new off-site garage
- Council chambers and city clerk offices
- A library layout featuring age-grouped reading areas, program space, study rooms, makerspace, director's office, and public computer access
- ADA-compliant restrooms and hallways
- Elevator and stairwell placement for accessibility and egress
- Exterior sidewalk redesign to improve drainage away from the building
- Site layout for a new two-car police garage on city-acquired land
- Recommendations for water and sewer line upgrades
- New fire protection system
- Window replacement
- Tuckpointing of exterior brick façade.

Work Plan

This work plan outlines the major milestones and sequencing for the City Hall consolidation project, beginning with client engagement on January 22, 2025, and culminating in the final client presentation in early May 2025. Each task was timed to build logically on the previous phase, from data gathering to programming and concept development and design selection, and from detailed modeling and cost estimating to presentation preparation.



Figure 9. Project Work Plan

Section IV Constraints, Challenges, and Impacts

1. Constraints

The New Sharon City Hall redesign project was shaped by several key constraints that directly influenced design decisions throughout the process. One of the most significant limitations was the building's existing structural layout. Originally constructed in 1901, the building features a load-bearing wall on the first floor and basement. While not a major obstacle, this wall restricted usable widths in these areas to a maximum of 20-feet, limiting options for large open spaces and requiring careful planning for room sizes and circulation paths.

Another constraint was the physical site. The building is located on a corner lot bordered by public sidewalks to the north and east, an alley to the west, and private properties directly to the south. These surrounding elements restricted opportunities for expansion, garage placement, or significant exterior reconfiguration. Any additions—such as the proposed police garage—had to be designed to fit within the limited space available without disrupting existing access routes.

Code compliance, particularly ADA standards, also presented constraints. Because the existing building was not originally designed for accessibility, integrating ADA-compliant features, such as an elevator, widened doorways, accessible restrooms, and proper sidewalk grading, required intentional design adjustments. While modern building and fire codes were incorporated throughout, the priority placed on ADA compliance shaped the layout, circulation, and room dimensions to ensure the facility would be accessible to all members of the public.

2. Challenges

Throughout the course of this project, several key challenges emerged that shaped the design and required thoughtful solutions. The most notable challenge was accommodating the full program of a modern public library within the limited footprint of the existing two-story building. Given the library's extensive list of functional requirements—including multiple age-specific reading zones, program space, study rooms, a makerspace, and staff areas—the entire second floor had to be dedicated solely to the library. This decision required careful coordination to ensure that city hall and police department functions could be comfortably and efficiently arranged on the first floor without overcrowding or compromising accessibility.

Finally, while the building's structural condition was generally workable, addressing water infiltration in the basement was necessary to protect storage and storm shelter functions. This

was mitigated by recommending the injection of flowable mortar into existing cracks in the foundation.

3. Societal Impact within the Community and/or State of Iowa

The expanded footprint within the building—growing from a total of approximately 3,000 square feet across the existing city hall and library to 9,600 square feet—will allow for vastly improved service delivery. The city hall component will benefit from larger council chambers, a more accessible front desk area, and additional staff workspace, all of which are designed to enhance public engagement and transparency. The library will see the greatest transformation, expanding from 1,800 to 4,800 square feet. With designated areas for different age groups, multiple study rooms, a makerspace, and an improved computer lab, the new library is expected to become a much more active community hub, supporting both education and enrichment programming for all ages.

Relocating the police department from its current location—seven blocks away from city hall and the downtown core—to within the new facility will significantly improve response efficiency and accessibility for residents. Centralizing law enforcement functions with other municipal services promotes a more integrated approach to public safety and strengthens community trust.

The project also prioritizes sustainable and resilient infrastructure. New sidewalks will be installed and properly graded to redirect stormwater away from the building, reducing the risk of basement flooding. A backup generator will ensure continued functionality in the event of a power outage, and a storm shelter will provide critical protection during severe weather events—a necessary feature given the area's vulnerability to tornadoes. Additionally, all windows will be replaced to maximize natural lighting during daytime hours, reducing electricity usage and enhancing interior comfort.

Beyond structural upgrades, the project supports greater community connection and longterm programming opportunities. The head librarian has already expressed interest in using the new space to host more events and create additional activity areas for children. In this way, the redesigned building will not only improve how residents access essential services it will also foster new opportunities for gathering, learning, and civic participation.

Section V Alternative Solutions That Were Considered

Alternative 1

This design features a clear and efficient division between city government functions on the first floor and public library services on the second floor. This layout allows the police department and library stairwell to be located near the building's side entrance, making them easily accessible to the public while maintaining a degree of separation between law enforcement and library patrons. The second floor is fully dedicated to the library, allowing ample space for reading areas, study rooms, a makerspace, and children's sections. This alternative offers a strong balance of function, accessibility, and programmatic clarity

Alternative 2

This design presented a slightly different flow, with greater integration of public service areas. While still functional, this layout featured less separation between departments and a more complex circulation pattern, which could create congestion or confusion in high-use areas. It did, however, maintain comparable access to key facilities and provided a slightly more centralized location for meeting rooms and shared resources. Ultimately, it was not selected by the New Sharon City Council.

Alternative 3

This design was developed during early stages but was not advanced beyond conceptual review within the team. In this layout, the second floor was used to house both the council chambers and portions of the library, while city hall and police functions were located primarily on the first floor. While this configuration offered a more even distribution of space usage across both floors, it limited the ability of the library to expand and created proximity concerns between public gathering spaces and more secure administrative functions. The reduced footprint available for the library made it difficult to accommodate the full list of functions provided by library staff, including program space and age-specific reading areas. For this reason, the team chose not to move forward with Alternative 3.

Section VI Final Design Details

1. Interior Details

The proposed city hall redesign will involve a complete demolition and reconstruction of both the first and second floors of the existing building. The project prioritizes safety, security, and functional improvements, while also incorporating restored architectural features to preserve the building's historical character. A full sprinkler system will be installed throughout the structure, and security cameras will be implemented to support law enforcement operations. Additionally, specialized fire protection will be provided to safeguard the city clerk's official records.

First Floor

The first floor will house the City Hall, the Police Department, and the City Council Chambers. The City Hall area will include offices for both clerks, a staff restroom, a meeting room, and a kitchenette and breakroom intended for use by city officials, librarians, and the police department. A restored rounded glass entryway that reflects the original character of the former City Hall will be featured along with an antique mirror display that adds historical significance to the interior space. The Police Department will include a service counter to control access to the secured rear portion of the facility, including sheriff's and deputy's offices, a staff restroom, and evidence storage. The City Council Chambers will be a large, flexible-use space with an approximate capacity of 60 people, designed to host both official city meetings and public events. The first floor will also include public restrooms, as well as a stairwell and an elevator providing access to the basement and the second floor. A fire escape in the northeast corner of the council chambers provides emergency egress.

Second Floor

The second floor of the building is designated for the City Library and is designed to accommodate various user groups including adults, young adults, juveniles, and children. Upon entering the library, patrons will be greeted by a large service desk and nearby display area showcasing new books and movies. The layout includes an office for the Library Director, which is connected to a dedicated storage room. The library will also feature two study rooms, a makerspace for hands-on learning and creative activities, a computer area for public access, and public restrooms. For safety, a fire escape will be in the northeast corner of the library.

Basement

The basement level is planned to include a storm shelter to provide protection in the event of severe weather. It will also contain a small public restroom, a dual-use electrical and mechanical room to support building operations and to support the elevator, and additional storage space designated for the city clerk.

Elevator

The city hall will feature a piston (hydraulic) elevator servicing the basement, first floor, and second floor of the building. A hydraulic elevator is a practical and efficient choice for a low-rise structure like this one due to its cost-effectiveness, reliable performance, and minimal overhead space requirements. Unlike traction elevators, piston elevators do not require a machine room above the shaft, making them ideal for buildings with height constraints and streamlined rooftop profiles.

This type of elevator operates smoothly and quietly, which is well-suited for a civic space aiming to maintain a calm and professional environment. It is also capable of accommodating ADA-compliant access, which supports the city's commitment to accessibility and inclusivity.

The elevator shaft will be constructed using standard concrete masonry units (CMU) for durability and fire resistance. The typical block sizing for the elevator shaft walls will be 8-inch CMU blocks, which provide the necessary structural support and fire rating. The walls will also be reinforced vertically and horizontally per code requirements, especially around door openings and shaft corners, to ensure stability and safety.

Security Cameras

The building will incorporate strategically placed security cameras throughout to enhance safety. By covering entrances, public counters, hallways, and parking areas, the system will help ensure the safety of city staff, residents, and visitors. Additionally, recorded footage can provide valuable documentation for resolving disputes, tracking incidents, and improving building management.

Fire Protection

This design will include a comprehensive fire protection strategy that combines a standard sprinkler system with specialized chemical suppression systems in sensitive areas. Throughout the general building, including in offices, meeting rooms, and public areas, a modern, code-compliant wet-pipe sprinkler system will be installed. This system will automatically activate in response to heat, providing rapid fire suppression and helping to prevent the spread of flames.

For high-value or sensitive storage areas, i.e., the police department's evidence room and the city hall's records and archival storage, a clean agent chemical fire suppression system will be implemented. These systems use non-water-based agents which extinguish fires without damaging documents, electronics, or critical evidence. This approach protects the integrity of irreplaceable materials while ensuring the same level of fire safety.

2. Floor Plans and Renderings



Figure 10. First Floor Plan



Figure 11. Second Floor Plan



Figure 12. Basement Floor Plan



Figure 13. Proposed Police Garage Floor Plan



Figure 14. Exterior Rendering



Figure 15. Front Desk Rendering



Figure 16. Police Department Rendering



Figure 17. Conference Room Rendering



Figure 18. Library Rendering



Figure 19. Library Rendering



Figure 20. Fire Escape

3. Exterior and Structural Details

New Sidewalks

We recommend new sidewalks be installed along the north and east sides of City Hall to help redirect rainwater away from the building and prevent water infiltration into the basement and foundation. The new sidewalks will be 4" thick and graded at a cross slope away from the building of no greater than 2.0%. This improvement will enhance long-term structural integrity by reducing the risk of water-related damage in the foundation. An installed ³/₄" expansion joint is recommended between the building's foundation and the new sidewalk to protect the building's foundation from the expansion of concrete during warmer months.

New Windows

We recommend replacing the existing old windows with new, energy-efficient units that match the exact dimensions and area of the original openings. This approach ensures the new windows integrate seamlessly with the existing structural framework, avoiding the

need for extensive modifications to the building's exterior. By maintaining the same window area, this preserves the architectural integrity and aesthetic of the structure while improving functionality, insulation, and long-term performance.

New Doors

New doors are recommended throughout key access points in the building to enhance security, accessibility, and energy efficiency. This includes replacing the doors at the north entrance, as well as the fire escape on the second floor to ensure compliance with current safety codes. Additionally, we advise updating the doors leading to the council chambers and the police department on the first floor to improve durability and functionality in high-traffic areas. The new doors will be selected to complement the building's design while meeting modern standards for safety.

Tuckpointing

The exterior brick façade of the building will require tuckpointing to address areas where mortar has deteriorated over time. Tuckpointing involves removing the damaged or crumbling mortar between bricks and replacing it with new, carefully matched mortar to restore the wall's structural integrity and appearance. This process is essential not only for preserving the aesthetic of the building but also for preventing moisture intrusion, which can lead to further damage or interior issues. By restoring the mortar joints, the tuckpointing work will help extend the life of the brickwork, improve insulation, and maintain the overall stability of the exterior envelope.

Foundation Repair

The building's limestone foundation will require targeted repairs to ensure the long-term stability and safety of the structure. The recommended repairs include cleaning and sealing the foundation to prevent further moisture infiltration, as well as filling cracks or voids with compatible flowable repair mortar to restore structural integrity.

New Load Bearing Wall

As part of the proposed renovations, we recommend the addition of a new load-bearing wall as a preventative structural measure during the repurposing of the west portion of the building. This wall will be placed to provide additional support to existing structural elements, particularly in areas where load distribution may change due to modifications in layout or usage. By implementing this wall during the renovation process, we aim to improve the safety of the storm shelter, reinforce the building's integrity, reduce stress on older framing systems, and ensure that the west section remains safe and stable for future use.



Figure 21. West Elevation Exterior View







Figure 23. North Elevation Exterior View



Figure 24. East Elevation Exterior View

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Figure 25. Exterior Sidewalk Design

Backup Generator

To ensure continuous operation of essential municipal services during power outages, the design includes installation of a backup generator. This addition supports critical functions such as communications and building lighting. The specific placement of the generator is left to the discretion of the project owner, based on site constraints, maintenance accessibility, and proximity to utility connections. Regardless of its location, inclusion of a generator enhances the facility's resilience and operational reliability.

Sewer and Water Services

It is recommended that the City of New Sharon have the existing sewer lines televised to assess their current condition. Given the age of the building and potential for deterioration or blockages, this inspection will help identify any areas in need of repair or replacement before major renovations take place. Based on the results, partial or full replacement of the sewer lines may be necessary to ensure reliable long-term service and avoid costly future disruptions.

With the planned addition of a fire sprinkler system, we recommend that an additional water service line is added. An additional line will ensure proper function of the sprinkler system and provide adequate water service for the building's updated usage.

4. Police Garage Details

A new police garage is proposed for construction on the open plot of land located approximately 40 feet south of City Hall, directly behind the Coffee Closet and Gathering on Main stores. This location provides proximity to the police department offices while maintaining a clear separation from public areas, enhancing both security and operational efficiency. The city would need to lease or buy the lot for this purpose.

The garage will be accessed via the existing alleyways and will require new construction, including a reinforced concrete foundation designed to support the weight of two police vehicles. The garage will provide secure, heated, weather-protected storage for law enforcement vehicles and equipment, contributing to faster emergency response times and improved overall functionality of the department. Proper grading and drainage will be incorporated to prevent water intrusion and maintain the foundation's integrity.



Figure 26. Police Car Garage Interior Rendering



Figure 27. Police Car Garage Interior Rendering

Section VII Engineer's Cost Estimate

The cost estimate for the city hall renovation project outlines a comprehensive breakdown of construction and material expenses, totaling approximately \$2.49 million before soft costs. The estimate includes a wide range of necessary upgrades such as restoration, utilities, elevator installation, roof drain plugging, and sidewalk repair. The major cost driver includes building restoration, which is crucial to ensure the facility is safe, modern, and up to current code. Enhancements like the installation of a new piston elevator, police garage construction, and sprinkler system further reflect a commitment to accessibility, safety, and functionality. The cost estimates were completed using RSMeans by Gordian and the 67th edition of the *2019 National Construction Estimator*.

To account for potential unforeseen expenses and design refinements, a 20% contingency has been included, totaling about \$498,000. In addition, a standard 8% engineering and administration fee covering design, permitting, inspections, and overall project management has been applied, amounting to nearly \$200,000. These soft costs are typical for a public remodel of this scale. One important note is that the cost of acquiring land has not been included in this estimate. Until a site is selected and appraised, the land acquisition cost remains an open and potentially variable factor.

Item	Total
Interior	\$2,199,800
Exterior	\$119,288
Service Lines	\$38,625
Police Garage	\$132,900
Total	\$2,490,613
20% Contingencies	\$498,122.60
8% Engineering and Administration	\$199,249.04
Total Project Cost	\$3,187,985

Figure 28. Cost Estimate

Appendices

Appendix A. Cost Estimation

Interior	Unit Price	Quantity	Total
Piston Elevator	\$335,000	1	\$335,000
Sprinkler System	\$1.50	14400 SF	\$21,600.00
Gutting	\$3	14400 SF	\$43,200.00
Restoration	\$125	14400 SF	\$1,800,000.00
Total			\$2,199,800.00
Service Lines	Unit Price	Quantity	Total
Water Service Replacement	\$200.00	70	\$19,500.00
Sewer Service Replacement	\$225.00	85	\$19,125.00
Total			\$38,625.00
Police Garage	Unit Price	Quantity	Total
Garage Door	\$2,400	1	\$2,400
Concrete	\$7.50	900 SF	\$6,750.00
Structural Elements	\$137.50	900 SF	\$123,750.00
Total			\$132,900
Exterior	Unit Price	Quantity	Total
Windows	\$750	31	\$23,250
Tuckpointing	\$9.74	4700	\$45,778.00
Plug old Roof Drain	\$800	1	\$800
Skim Coat Patch	\$6	3550	\$21,300
Flowable Mortar	\$6	300	\$1,800
Sidewalk Repair	\$24	640	\$15,360
Fire Escape	\$11,000	1	\$11,000
Total		<u> </u>	\$119,288

Appendix B. Bibliography

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Appendix C. Alternative Design



Figure 29. Alternative Basement Design



Figure 30. Alternative First Floor Design



Figure 31. Alternative Second Floor Design