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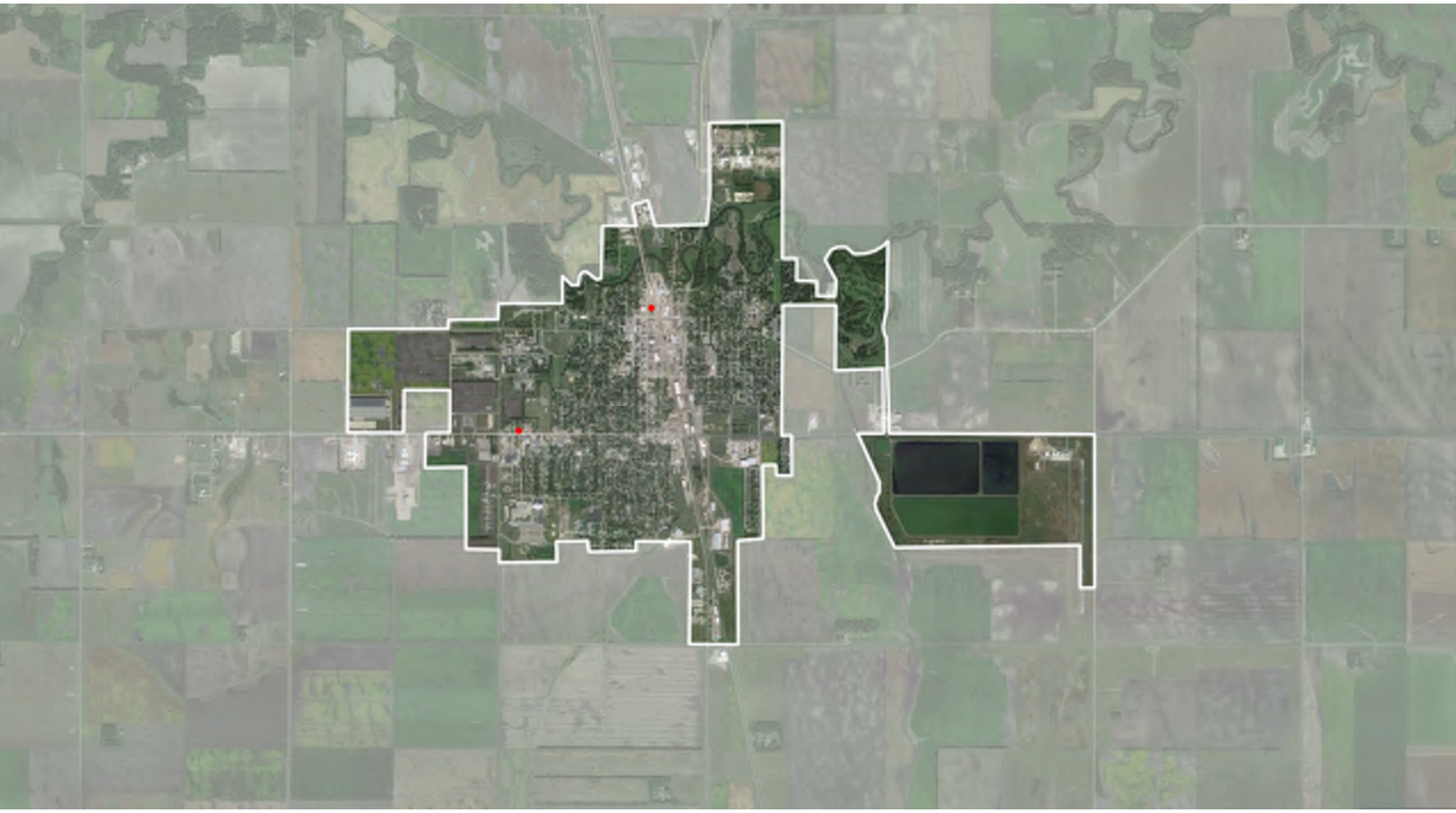
Grafton Fire Department Study

City of Grafton, North Dakota

August 25, 2016



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August 25, 2016

Grafton Fire Department
5 East 4th Street
Grafton, ND 58237

RE: Report for the Grafton Fire Department Study

Dear Chief Popiel, Board Members, and Firefighters:

We enjoyed working with you to evaluate your current fire stations and plan for the long-term needs of your department. The attached report shows our findings. This report should allow the City and Department leadership to make informed decisions about the most appropriate course of action for the community.

The goal of the study was to identify multiple planning options that will support efficient and highly-functional operations for current and future staffing, that compare appropriately to projects that nearby communities have undertaken, that are economically responsible, and that are in-line with the broader planning goals for the City of Grafton.

The process included the following steps:

Existing Conditions Review – We studied the original construction documents and physically toured the existing spaces being utilized by the department and developed a list of physical and functional deficiencies, including deficiencies with regards to NFPA Compliance and a list of functional concerns.

Programming – We met with the department to discuss the rooms and spaces required to function effectively. We looked at demographic trends to understand the impact that future development might have, and we created a program of spaces for the project based on national standards, the stated needs of the Department, and our professional experience..

Potential Site Review – We reviewed the community for potential station locations, including existing locations, new downtown locations, and a parcel north of Station 102.

Masterplanning Concepts – We produced three building program options (a large, a medium, and a small footprint) and examined each to understand impacts of size and functionality on the department and the potential project budget.

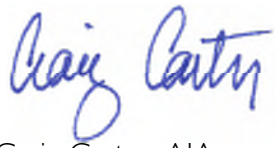
Project Implementation Review – We provided conceptual level review of the project schedule and project budget.

This report lays of the results of each of these steps for public record and provides the basis for informed decision making as the project moves forward. Thank you again for the opportunity to serve the Grafton Fire Department. Please feel free to contact us should you have any questions about this report.

Sincerely,

BKV Group, Inc.

Bruce Schwartzman, AIA
Partner



Craig Carter, AIA
Senior Associate

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Acknowledgements

BKV Group would like to thank Brad Martinson for spearheading this effort and showing us around the existing fire stations.

BKV Group would like to thank the Board of Directors, the Officers, and the Firefighters of Grafton for the opportunity to work with them on this project

Board of Directors:

President	Dean Woinarowicz
Vice President	John Maxwell
Secretary/Treasurer	Shane Mohn
Fire Chief	Ken Popiel
Director at Large	Rick Byer

Fire Department Administration:

Fire Chief	Ken Popiel
Assistant Chief	Jeff Moe
2nd Assistant Chief	Dean Woinarowicz
Captain	Spencer Potts
Caption	vacant

Executive Summary

BKV Group was retained in early 2016 to review the conditions of the Grafton Fire Department facilities, assess the future needs of the Department, and recommend how to move forward.

There is very limited space at both Station 101 and 102 and both buildings are showing their age. Station 101 was built sturdily, but the size and configuration of the spaces are not consistent with a modern fire department and cannot be easily modified. Station 102 has exceeded the expected lifespan of a pre-engineered metal building. Both buildings would require significant investment into physical repairs to remain reliably operational over the next ten years.

There are several operational issues at each location that put firefighters at risk of injury or illness. Most concerning are as follows:

- The lack of proper decontamination/ shower facilities to allow firefighters to remove contaminants before bringing them home to their families.
- The tight physical spaces which, combined with backing into the apparatus bays, poses risk of a firefighter getting pinned by a truck.
- The lack of compartmentalization between apparatus bays and office/ living areas, which allows diesel pollutants to permeate the buildings.
- The location of the man door into Station 101 requires that responding firefighters cross the path of apparatus leaving the station.
- The lack of dedicated space for exterior prop training adjacent to classroom training.
- The lack of a physical conditioning room for cardiovascular and strength training exercise.
- The lack of modern electronic safety sensors for CO monitoring, stopping overhead doors due to obstruction, etc.

In addition to these operational concerns, there are code deficiencies (e.g. lack of separate restroom facilities for women), accessibility issues (e.g. wheelchair clearances, protruding objects), and risk management concerns (e.g. storage in apparatus bays, lack of sprinkler systems).

Finally, there are operational complications associated with the Department operating out of two locations. There are duplicated expenses, duplicated equipment, transfer time back and forth, and concerns about enough staff responding to the station with the appropriate equipment for the emergency in question, delaying response when seconds count.

Based on national standards, interviews with the Fire Department, and our experience, BKV Group assembled three potential building programs for consideration.

- Program A, at 34,379 square feet, represents a 9 bay fire station with training and fitness spaces, amenity spaces for the firefighters to aid recruitment and retention, and a new 800-person community hall facility with associated storage, kitchen, restrooms, and mechanical spaces.
- Program B, at 24,809 square feet, represents an 8 bay fire station with classroom training, physical training, and fitness spaces in line with national standards.
- Program C, at 18, 628 square feet, represents an 8 bay fire station with tighter bays and only the minimal functional elements to support the workflows of the firefighters and to provide for their safety and welfare.

BKV Group looked at potential expansion at each existing station location, but the sites are poorly suited to the size of a combined station. A combined station could be placed downtown if a full city block could be acquired,

but stormwater detention would need to be accommodated underground and some building elements might move to a second floor, which increases project costs significantly. A combined station would easily fit on the State-owned land directly north of Station 102, including space for a future training tower and a Community Hall with associated parking.

A new station would take approximately 9 months to design and another 12 months to bid and construct. Construction costs could vary depending on the materials used. A pre-engineered metal building might cost ~$113 per square foot while brick over CMU with metal roofs and high-performance building systems might cost ~$308 per square foot. Assuming a new station of 25,000 square feet (Program B) that starts construction in 2017 and that the department elects to pursue a middle-of-the-road construction quality, BKV Group recommends planning for a construction cost around $5,400,000. Total project costs would be on the order of $6,500,000 which includes a healthy contingency. Construction costs escalate over time, so we recommend planning for an additional 4% of costs each year.

Until the Department can define a project budget, these numbers remain somewhat arbitrary. Both the size of the station and the quality of construction can be adjusted to accommodate funding realities once those are known. BKV Group recommends working with the City of Grafton, Walsh County, and the State of North Dakota for potential funding assistance. We also recommend investigating low-interest loans through the USDA and any local sources of grant funding. An understanding of the cash flows that can be used to pay down the loan is the first step to understanding the budget capacity of the Department.

A project such as this is dauntingly expensive, but an architect experienced in fire station projects can help limit costs, separate elements for grant funding, plan for phasing the project over time, and provide advice about self-performing some of the work if volunteers want to help construct the facility.

While BKV Group has not met with the Grafton Police Department to perform a study similar to this one, we are aware of space concerns in the building the Police share with the County Sheriff. If the Police were interested in moving into a combined public safety building, we roughly estimate an additional 8,000 square feet of building, which translates into $1,800,000 of additional total project cost. By constructing a combined facility as opposed to two separate buildings, the citizens of Grafton would save ~$750,000 of project costs.

Next steps for the Fire Department should include:

- Meet with the City about the combined public safety concept and any potential City financial contributions to the project.
- Make this report available for the general public and set up times for the public to visit the Stations and observe the conditions firsthand.
- Examine the likelihood of being able to acquire a full city block downtown without displacing residents or businesses and without taking on any environmental contamination liability.
- Meet with the State to determine availability of the land north of Station 102 and the disposition of the Station 102 property once the Department moves out.
- Obtain an architect's sketch of the potential project for use in a public awareness campaign.
- Meet with a financial advisor to determine the ultimate capacity of the Department given all funding sources.

Existing Conditions Assessment

The purpose of this section of the Study is to document the condition of the two Grafton Fire Department buildings. This information provides the necessary data to enable the City to make informed decisions regarding how to best address any repairs, upgrades and/or replacements as part of the City's long range planning. There are two components to the Existing Conditions Assessment:

An on-site *Physical Condition Assessment* of the building was performed to determine maintenance issues, safety and code concerns, remaining useful life for the building systems and finishes, and to review how current conditions affect building system operations and energy costs.

A *Functional Assessment* was performed through observations and discussions with key staff. It determined how existing building conditions are affecting staff operations and the ability to serve the community. The Functional Assessment also examined how present operations and workflows compare to current recommended best practices in the industry.

The assessments are intended to provide an indication of the capital maintenance requirements, potential code and regulatory required upgrades, and other building conditions which should be considered as part of the facility's general upkeep as well as part of any building project. It is beyond the scope of this study to provide detailed cost estimates of these interventions, nor does this study address areas of the building that are concealed behind walls or locked doors.

Fire Station 101 Building Description

Station 101 is located in the City Hall building at 5 East 4th Street. The City Hall was constructed in 1938 as an addition to the existing Fire Hall and Power Plant. The portion of the building currently occupied by the fire department is the pre-1938 portion. The fire department occupies ~4,125 square feet on the ground level and has ~1,400 square feet on the second floor for their "Firemen's Hall." The exterior walls are constructed of brick masonry with plaster on the interior face. Most of the original window and door openings have been bricked up. The roof is wood plank decking over metal joists. The fire station has hydronic unit heaters and an air filtration system for exhaust extraction. The Firemen's Hall has radiator heat.

Fire Station 102 Building Description

Station 102 is located at 845 West 12th Street. It was constructed in 1984 and totals 4,500 square feet on the ground floor with a storage mezzanine of approximately 1,000 square feet. The building is constructed as a typical pre-engineered metal building with girts and purlins spanning between the main steel members. Exterior metal wall panels are fastened over a layer of 4" fiberglass batt insulation with exposed fasteners. The standing seam roof is fastened to the purlins through a layer of 4" fiberglass batt insulation. The building has a 200 amp electrical service and is heated with electric resistance unit heaters and in-floor electric radiant heating installed in the 12" sand base below the slab.

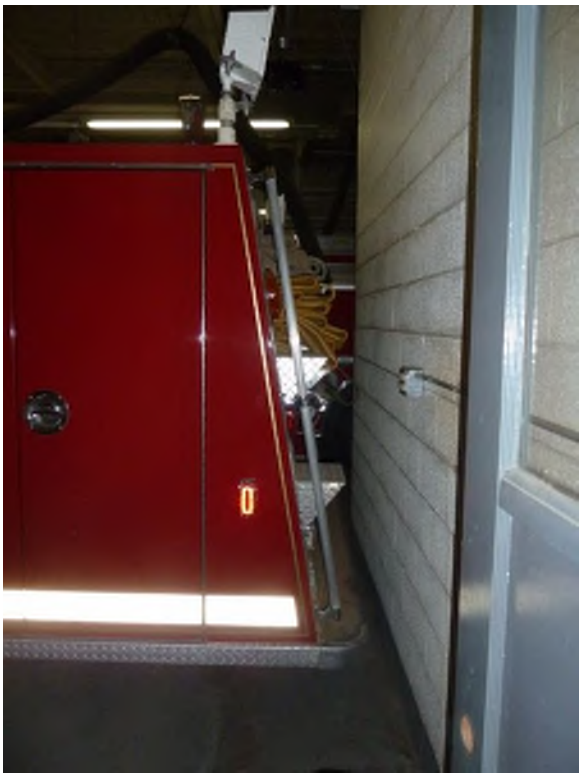
No sprinkler system

Flammable cabinet bent, no longer able to contain fumes

No photo-eyes on bay doors, creating pinning/ crushing hazard

SCBA repair and cleaning area takes place in dirty environment

No exhaust removal system in maintenance bay



Insufficient walking space around apparatus

Insufficient space for maintenance shop, too close to fire apparatus

Insufficient decontamination space for SBCA masks and equipment

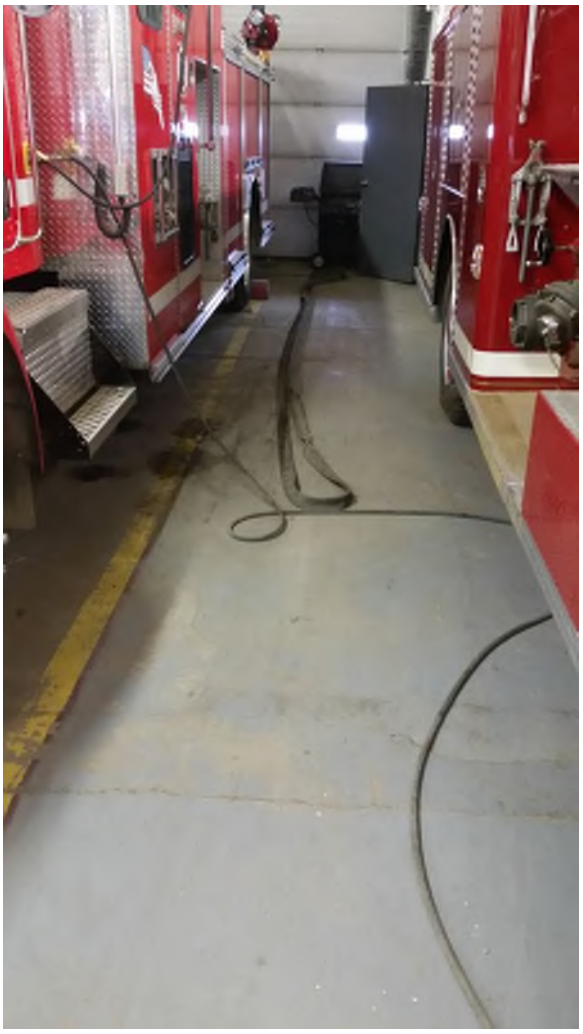
Pedestrian entry into station during a call crosses apparatus response path

Only one means of egress from Firemen's Hall

Unseated electrical cover plates

Limited floor drains and insufficient slope results in pooling water and slip hazards

Equipment stored in front of electrical panels



Shore lines laying on floor create tripping hazard

Turnout gear stored on bay walls too close to apparatus. Solid panels at gear lockers restrict evaporative drying of turnout gear

Ladder to hose drying not secured

Station 101 Repair/ Maintenance Issues

Roof due to be replaced next year

Cracks in floor, some down to rebar

Weatherstripping at rear apparatus door needs replacement

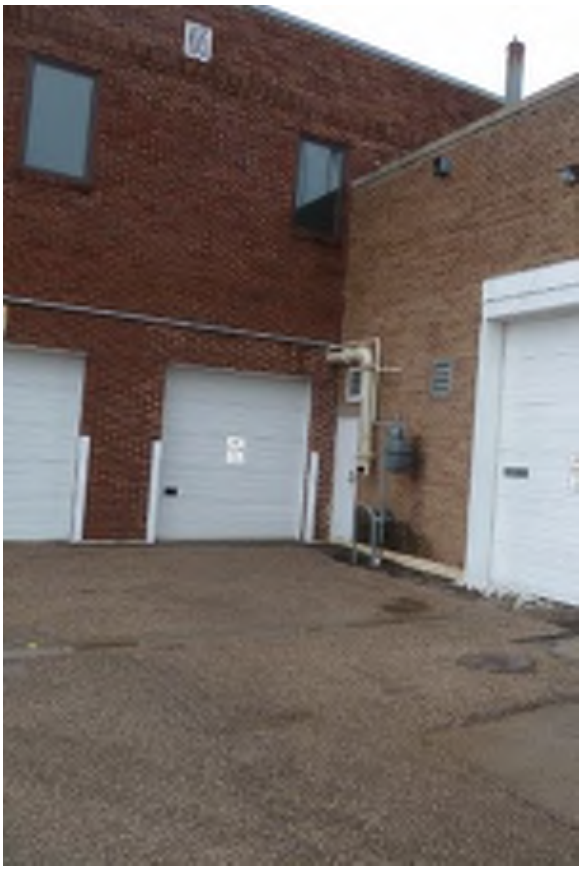
Mechanical exhaust system motor needs maintenance

Exterior needs tuck pointing at parapet above the bay doors

Exterior needs tuck pointing along the north wall

Apparatus door jambs need to be re-caulked

Kitchen casework in Firemen's Hall past the end of its useful service life



Client reported leak under window of Firemen's Hall

Roof drain discharges water at building wall, creating environment for molds and lichen and causing brick to spall and deteriorate

Grading at rear apparatus door slopes towards building

Wood framing below shower pan not protected from moisture and shows evidence of disintegration

Asphalt past the end of its useful service life. Exhibiting potholes, cracks, disintegrating top layer

Fixtures and finishes in toilet room past the end of their useful life

Plaster cracking and falling off interior walls

Ceiling tiles loose at Firemen's Hall

Carpet at Watch Office past the end of its useful service life

Shower area degraded to the point of uselessness

Station 101 Building Code Issues

Fuse box serving Firemen's Hall no longer code compliant

Access to fire boat in basement through door directly onto ramp

No separate restroom facilities for men and women

No evidence of code required sand trap/ oil separator from apparatus bay drains

No code required ventilation in office

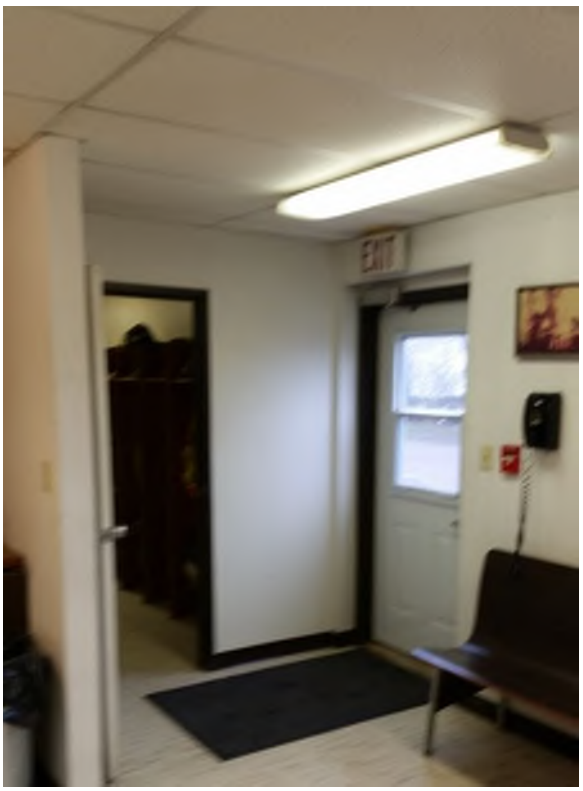
Station 101 Accessibility Code Issues

Kitchen appliances, casework, and fixtures not accessible

Toilet room not accessible due to step

No wheelchair maneuvering clearance at the doors to/ from corridor

Station 102 Occupant Safety Issues



Exit lights are not operational throughout the facility

No exhaust provided in turnout gear storage room to capture off-gassing toxins

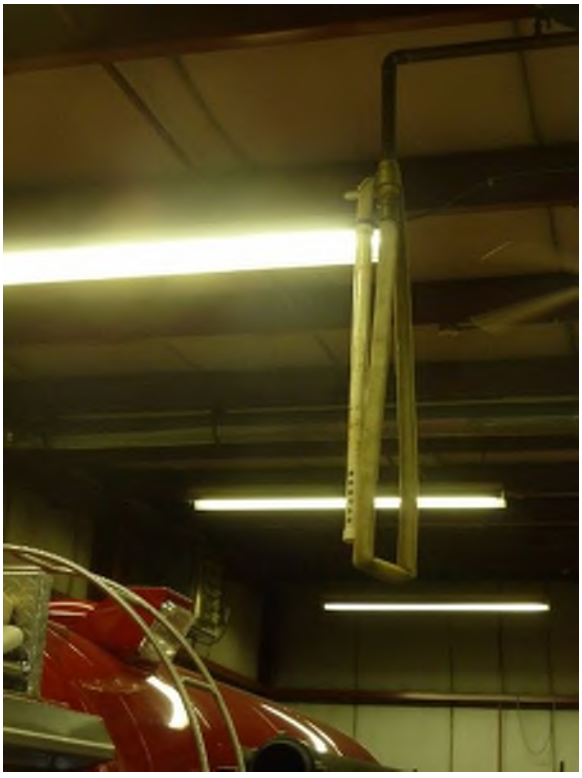
Solid panels at gear lockers restrict evaporative drying of turnout gear

Insufficient space for maintenance shop, too close to fire apparatus

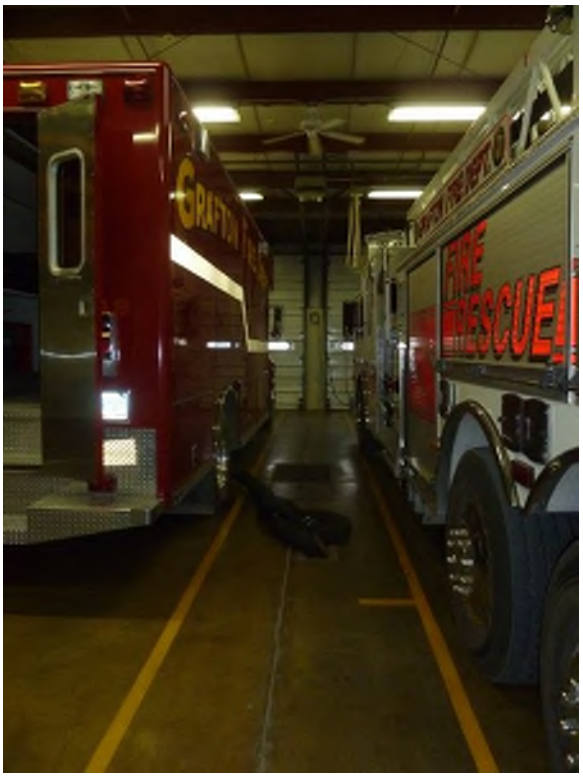
Direct capture tailpipe exhaust requires climbing over apparatus to attach, and lack of seal at attachment point allows some exhaust to escape into the space

Limited floor drains and insufficient slope results in pooling water and slip hazards

Center column in apparatus bay creates pinning/ crushing hazard by backing apparatus



Overhead truck fill requires climbing on apparatus to operate



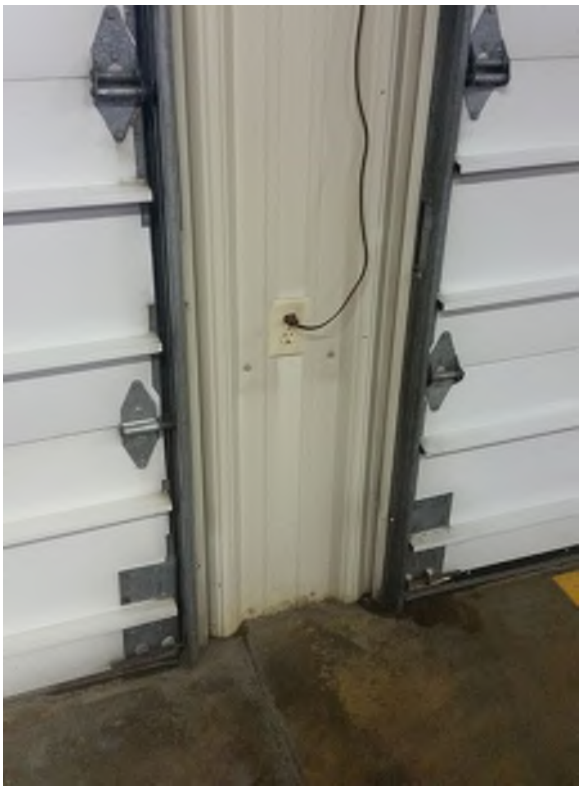
Underslab exhaust hose creates a tripping hazard

Oil pit grating not flush with surrounding concrete, creating a trip hazard

No sprinkler system

Rear door stoop has separated from building

Concrete has cracked and settled in apparatus bays, creating trip hazard at joints



No photo-eyes on bay doors, creating pinning/ crushing hazard

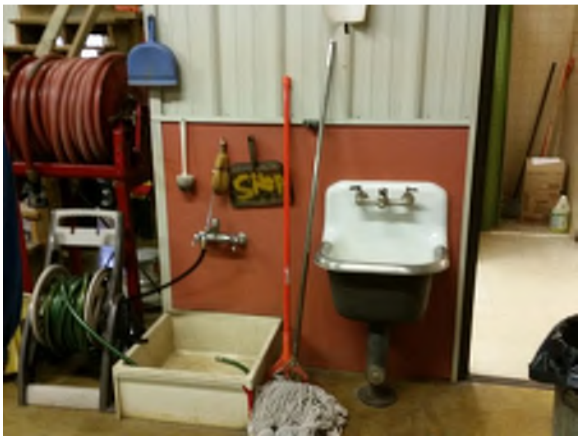
Sidewalks heaving/ settling compared to stoops, creating trip hazard

Southwest downspout discharges across sidewalk, creating potential for ice formation

Insufficient walking space around apparatus

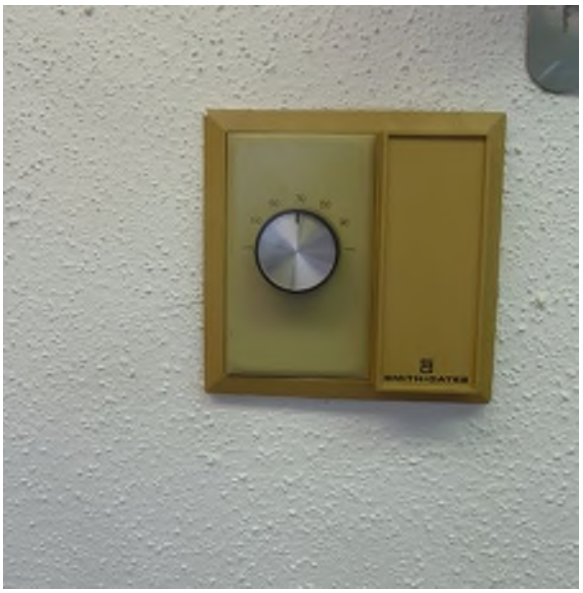
Electrical equipment not protected from vehicle traffic by bollards

Apparatus apron is too flat, creating water ponding issues that may freeze and create slippery conditions for apparatus exiting



Insufficient decontamination space for SBCA masks and equipment

Station 102 Repair/ Maintenance Issues



Client reports that in-floor radiant heat system broken

Cracked light fixture lens in watch office

Evidence of roof leaks at ceiling tiles. Client reports having repaired roof several times.

VCT showing signs of distress with gapping at joints and crushing at turnout locker partitions, nearing end of useful service life

Exhaust fan needs maintenance, rebalancing

Stove and cabinets at end of useful service life

Ceiling tiles exhibit significant sag and are at end of useful service life

Shower needs re-grouting and new curtain

Water valve broken at street, creates water hammer problems inside building

Concrete floor in apparatus bay showing signs of deterioration

Spray foam insulation exposed on exterior

Grade slopes towards footing at north wall

Southwest downspout damaged and leaking down face of building

Asphalt at parking lot past the end of its useful service life. Exhibiting potholes, cracks, disintegrating top layer

Glazing panels in sectional overhead doors have large gaps at seals

Bottom of metal wall panels beginning to deteriorate

Spalling at concrete footing wall at northeast corner of building

The west side of apparatus door closest to the office is damaged

No visible flashing at base of wall condition - allowing water into wall system

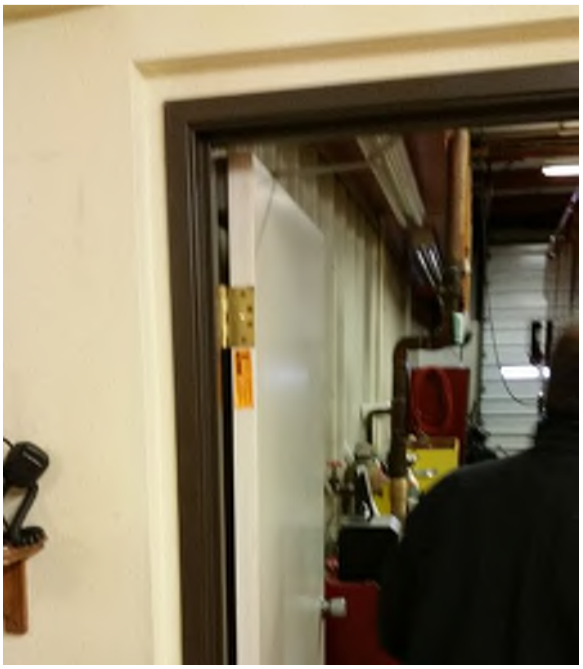
Sealant failing at all locations – needs to be re-caulked

Weatherstripping at overhead doors damaged and needs replacement

Station 102 Building Code Issues

No separate locker and toilet facilities for females

No code required ventilation in office



Fire rated doors held open by door stops

Staircase has open risers and non-compliant handrails/ guardrails

Exterior stoop at west side not flush with interior floor slab

Exterior electrical outlets do not comply with current Electrical Code

Exterior electrical outlet missing weather protection cover

Station 102 Accessibility Code Issues

Door knobs not ADA accessible

No wheelchair maneuvering clearance at the four doors to/ from corridor

Kitchen appliances, casework, and fixtures not accessible

Fire alarm panel is protruding object

Radio shelf is protruding object

No detectible warning features between sidewalk and parking spaces

Lavatory, shower, urinal, and toilet not accessible

No 5'x5' pad at entry doors

Station 102 Energy Use Issues

T12 fluorescent light fixtures are inefficient compared to T8 fluorescent fixtures or LED fixtures

Roof and wall insulation compressed at each girt and purlin, rendering it less efficient at resisting each transfer

Frequent tears in vapor barrier at ceiling/ walls throughout facility allows moisture into batt insulation, rendering it much less efficient at resisting heat transfer

No make-up-air for exhaust system requires exterior doors to be propped open when exhaust is operating

Functional Issues

Responding to Calls

The flow of responders from the parking lot to the turnout gear storage room is arranged well at Station 102, but the tight spaces and trip hazards within the apparatus bays makes getting to the apparatus difficult and unsafe. At Station101, there is no parking dedicated to firefighters and once parked, they must pass in front of the apparatus doors to access the station, putting them at risk of being hit by a truck hurrying out to a call. Once inside the bays, firefighters have to stand uncomfortably close to the apparatus to don their turnout gear.

Responding to certain calls takes extra time because apparatus are stacked in the bays and the vehicle in front must be moved first. At Station 101, most of the apparatus has to maneuver within the apparatus bay to head out the one overhead door. Once out the door, there is not enough depth to the apron to allow the truck to pull completely out of the building before stopping at the curb to wait for traffic to clear. The fire boat is stored in the basement of City Hall. To retrieve it, a pickup truck must be backed down a steep ramp, connected to the boat trailer, and then driven back up. This adds minutes to response times.

Upon returning from a call, the trucks must be carefully backed into the buildings. This process comes with real danger to the personnel assigned to stand outside the vehicle and guide it into place. In many cases, there are inches between the rigs and the rear walls of the building because there simply isn't enough length. The proximity within which the vehicles are parked to each other, the walls, the center column at Station 102, and other functional spaces creates significant risk to for getting personnel or equipment accidentally pinned by the apparatus. At Station 102, the apparatus doors are only 12' wide, which increases the likelihood that backing apparatus will contact the door jambs. At Station 101, the apparatus are forced to block the street, then back in at an angle before finally cutting the wheels and straightening out. The direct tailpipe exhaust capture systems, which are provided for some but not all parking spaces within the bays, require clambering up the side of the rigs, reaching for the exhaust hose, and manually sleeving it over the hot exhaust pipe. This process creates a risk for falls and burns, and since it cannot be completed until the vehicle is parked, does not prevent the first few minutes of diesel exhaust from flooding the room.

Low apparatus door heights at both stations will prevent the Department from purchasing the next generation of Aerial vehicles without expensive customizations to reduce heights.

Cleaning and Decontamination

There is no dedicated decontamination space for cleaning equipment after a call and there are insufficient facilities for the entire crew to shower within a reasonable time frame. There are no accommodations for female firefighters to use the restroom or shower at Station 102, and the single restroom at Station 101 is in such bad repair that it is seldom used. There are no personal lockers to allow storage of a clean set of clothes at the station, and there are no laundry facilities to wash the clothes worn under the turnout gear.

Washing the fire apparatus is important to extend the lifespan of the vehicles. Unfortunately, it is very difficult to wash when there is little clearance between trucks, and soapy water pooling on the floor due to lack

of drains and proper slopes makes the process risky.

Currently firefighters are putting themselves and their families at risk by bringing contaminants home from the fire scene. There is no separation between "dirty" and "clean" areas at Station 101, and in fact the only spaces that aren't directly open to the exhaust and fire ground toxins of the apparatus bays are the unused restroom and the watch office, which sits inside the apparatus bays, has no separate mechanical system, and has carpet on the floor that absorbs all of those harmful chemicals and transfers them to the shoes of the firefighters. The separation between "dirty" and "clean" at Station 102 has been defeated by door hold-opens, which are used because the doors swing the wrong direction or are in space to narrow to use comfortably.

Storage space at both buildings is insufficient, as evidenced by the amount of equipment on the perimeter of the apparatus bays. This makes cleaning the Apparatus Room very difficult and results in accumulation of harmful diesel particulates on the wall and floor surfaces, as well as on the equipment itself. Some storage rooms require shuffling sideways along the shelves to get access to items at the far end of the room. Maintenance shop spaces are undersized for the types of tasks required to keep the small equipment running smoothly.

Modern turnout gear is extremely effective at protecting firefighters from heat, smoke, and water. However, it must be well-cared for to be effective. This requires storing it apart from diesel exhaust contamination, away from all sources of UV light and especially sunlight, exhausting the space to prevent off-gassing toxins from resettling on the gear, being properly washed and dried, and allowing for final drying with specially designed locker systems.

Gathering and Training

There is an assembly space at Station 102 where firefighters can gather to wait for the next truck to leave or after a call to debrief, but there is no similar space at Station 101. Instead, firefighters gather around the Watch Office, standing in the apparatus bays.

Training space is sufficient at Firemen's Hall, but there is little space for exterior hands-on training after a classroom-style session. When inviting neighboring departments for a joint training session, the Hall is difficult to find, gets crowded quickly, and parking is inconvenient.

The Department runs a very successful Steak and Lobster dinner every year as a fundraiser, but is forced to host this event at the Winter Sports Arena because there is no other space in town large enough. This artificially restricts ticket sales and suggests that there may be a demand in town for a larger community banquet hall.

There is no physical conditioning space at either fire station. The majority of line-of-duty deaths in the fire service are due to heart attacks while on a call or shortly after returning. Preparing for the stress and physical exertion required for the job is critical to the long term health and safety of the firefighters. A dedicated room for fitness equipment is also an excellent amenity to aid recruitment.

Locations

Station 101 is located in close proximity to active railroad tracks. A derailment might seriously damage the building and the apparatus within, preventing the department from effectively responding to the incident. Station 101 is also located within the flood zone and has needed sandbagging to protect it from water damage. This effectively takes

the station out of service until the floodwaters recede. It is recommended that any new facility be located above the flood elevation and a safe distance away from the railroad tracks.

Station 102 was built because the department was out of space at Station 101, not because the community size dictated two stations for response time coverage. That decision bought the department another 30+ years, but now both stations are out of compliance with NFPA and OSHA standards, with building codes, and with fire service industry standards intended to improve firefighter health and safety.

The fact of two stations has created some functional issues for the department. Hose and gear drying can only be accomplished at Station 101, for instance. All hose cleaning occurs at Station 101, and it is transported back to Station 102 later. In some cases, having two stations has necessitated a doubling of equipment – multiple washer/ extractors, workshop tools, office furniture, backup generators, kitchen appliances, traffic control signalization, lawn mowers, snow blowers, etc.

Perhaps most critically for a small volunteer department, there are situations where the minimum number of firefighters to staff a truck might not be met at either station, but if the firefighters were all responding out of the same station, the minimums would be exceeded.

NFPA Compliance

The National Fire Protection Association (NFPA) creates and updates the national standards addressing many aspects of the fire service industry. The standards are developed through an open and consensus based process, and represent the collected knowledge of the nation's firefighters and allied industries. Many of the standards have an impact on the physical space that fire departments occupy. Both Station 101 and Station 102 are non-compliant with several of these national standards.

NFPA 1500 requires that fire stations be in full compliance with all applicable health, safety, building, and fire codes. The stations do not achieve that, as previously discussed.

The stations are non-compliant with NFPA 1500 in several ways. They lack CO monitors in the living areas, they do not prevent exposure to exhaust emissions, they do not have space for effective central record keeping for written policies, standard operating procedures, risk management plans, occupational safety and health plans, incident records, meeting minutes, etc.

The stations lack a fitness room in support of the Health-Related Fitness Program required by NFPA 1583. Access to fitness equipment can be provided out-of-house.

The stations lack in-house training capabilities to address the requirements of NFPA 1500, NFPA 1720, and various other NFPA standards. These can be addressed at fire school or other offsite locations, but annual training of each skill set is required and can be difficult for volunteers to achieve without local training options.

The stations are non-compliant with NFPA 1581. The stations lack facilities for effectively drying PPE, PPE storage areas are not well-ventilated, and Station 101 does not comply with the prohibition of natural light exposure for PPE.

The stations lack adequate space for performing SCBA maintenance and inspections per NFPA 1852. This service can be performed by a third-party if the budget allows.

The stations lack testing assemblies for the required annual checks of various equipment - hose and nozzles per NFPA 1962, ladders per NFPA 1932, power rescue tools per NFPA 1936, apparatus mounted pumps per NFPA 1901, and SCBA fit testing per NFPA 1852 and 29 CFR 1910.134. These services can be performed by a third-party if the budget allows.

The stations are non-compliant with NFPA 1581 in several ways. Both lack appropriate handwashing facilities for decontamination before entering the living areas. The kitchenette in Station 102 does not have functional appliances, a double basin sink, or a sprayer attachment. Neither kitchen area has appropriately non-porous surfaces for storage of kitchenware. The restrooms provided for firefighters at each station do not meet plumbing code standards. There are no dedicated and physically separated decontamination spaces in either station for the cleaning of PPE, portable equipment, and other clothing. Neither station has a PPE dryer to go along with its PPE washer/ extractor.

Space Requirements Study

BKV Group conducted a planning workshop to understand the current policies and procedures of the department and identify the goals a new station should achieve. Based on this information, BKV Group prepared three Program options that show appropriate rooms and spaces based on national standards, current staffing, and current equipment levels.

Goals

Safety around apparatus, whether moving or parked

Turnout gear protected from diesel exhaust, UV light, and weather

Adequate space to change into turnout gear

Safe path of travel from parking into building

Functional kitchen with modern equipment

Sufficient storage for critical supplies and equipment

Physical Conditioning Room to support firefighter health and safety

Safe apparatus doors

Training opportunities designed into facility

Current Staffing

40 maximum volunteers

Current Apparatus

7 pumpers/ tankers

1 aerial platform

1 rescue

1 grass rig

1 pickup

1 van

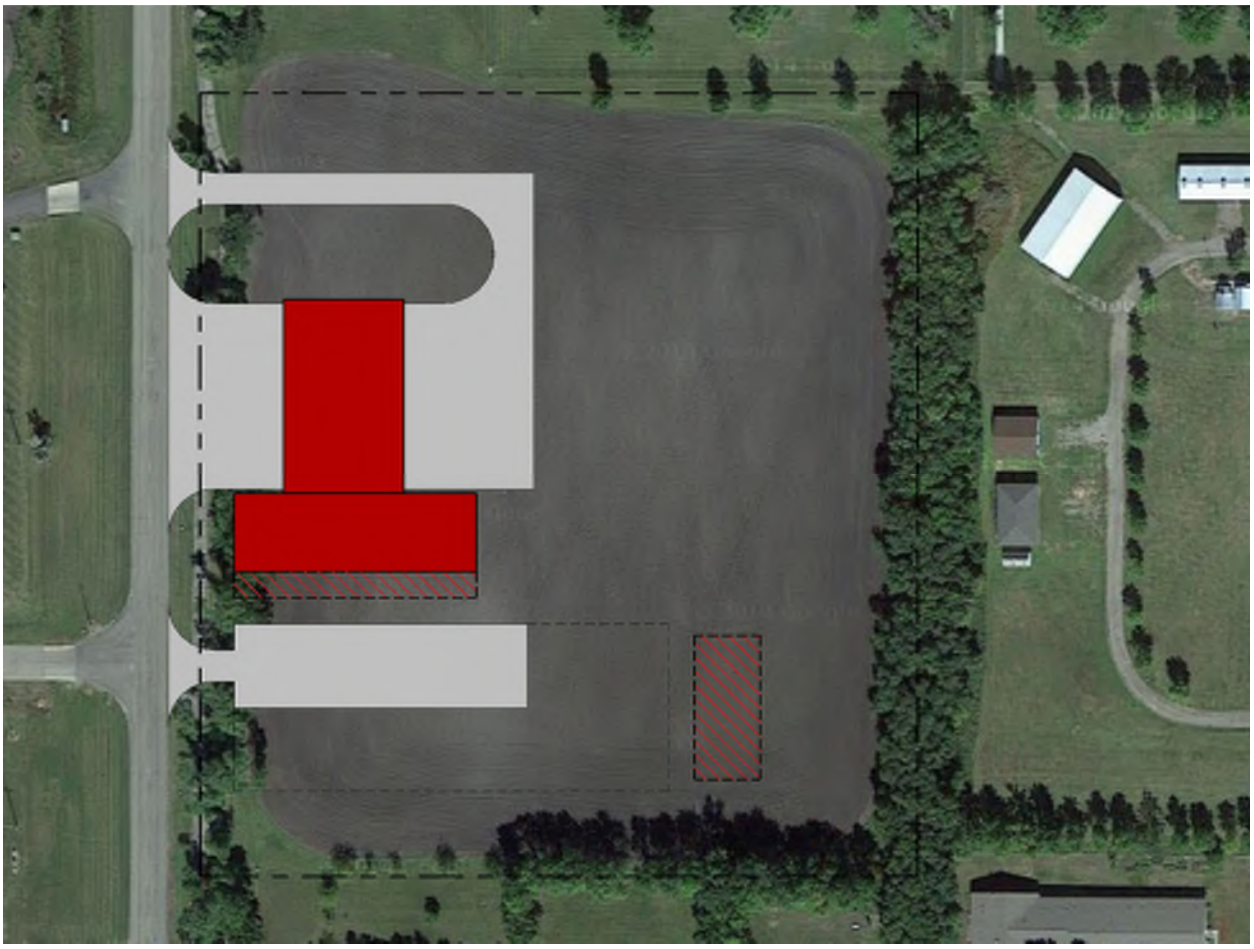
1 16' boat trailer

1 parade truck

	OPTION A			OPTION B			OPTION C		
	count	unit area (sf)	net total (sf)	count	unit area (sf)	net total (sf)	count	unit area (sf)	net total (sf)
Public Areas			5,310			1,621			0
Vestibule	2	70	140	2	50	100	0	0	0
Lobby	1	100	100	1	100	100	0	0	0
Museum	1	300	300	1	300	300	0	0	0
Public Restrooms	2	250	500	1	56	56	0	0	0
Community/ Training Room	1	3500	3500	1	950	950	0	0	0
Community Room Kitchen	1	300	300	0	0	0	0	0	0
Coat Room	1	120	120	1	15	15	0	0	0
Storage Room	1	350	350	1	100	100	0	0	0
Office / Training Areas			920			320			200
Conference Room	1	220	220	0	0	0	0	0	0
Chief's Office	1	140	140	0	0	0	0	0	0
Treasurer's Office	1	120	120	0	0	0	0	0	0
Fire Marshall's Office	0	120	0	0	0	0	0	0	0
Fire Prevention Office	0	120	0	0	0	0	0	0	0
Fire Prevention Storage	1	120	120	0	0	0	0	0	0
Captains Office	0	140	0	0	0	0	0	0	0
Station Watch Office	1	200	200	1	200	200	1	140	140
Copy Room	0	108	0	0	0	0	0	0	0
Storage Room	1	120	120	1	120	120	1	60	60
Living Areas			3,115			2,810			1,210
Male Locker Room	0	500	0	0	0	0	0	0	0
Female Locker Room	0	200	0	0	0	0	0	0	0
Individual Bunk Room	0	85	0	0	0	0	0	0	0
Shared Locker Room	1	400	400	1	400	400	1	400	400
Unisex Shower Rooms	4	80	320	3	80	240	2	80	160
Laundry Room	1	100	100	1	100	100	1	100	100
Storage	1	120	120	1	120	120	0	0	0
Dayroom	1	625	625	1	400	400	1	400	400
Game Room	1	400	400	1	400	400	0	0	0
Dining Room	0	250	0	0	0	0	0	0	0
Kitchen	1	350	350	1	350	350	1	150	150
Physical Conditioning Room	1	800	800	1	800	800	0	0	0

Apparatus Bays			14,580			12,520			12,140
Apparatus Bays (18x90)	8	1620	12960	5	1620	8100	8	1440	11520
Small Vehicle Bays (16x35)	0	0	0	5	560	2800	0	0	0
Wash / Repair Bay	1	1620	1620	1	1620	1620	0	0	0
Apparatus Bay Support			2,470			2,050			1,372
Decontamination	1	120	120	1	120	120	1	120	120
Turnout Gear Storage	1	440	440	1	440	440	1	440	440
Staging & Coats	1	150	150	1	150	150	1	12	12
Compressor and Fill	1	140	140	1	140	140	1	140	140
SCBA Repair Shop	1	140	140	0	0	0	0	0	0
Medical Storage	0	100	0	0	0	0	1	110	110
Hose Tower with Training	1	400	400	1	400	400	0	0	0
General Storage	1	600	600	1	400	400	1	400	400
Hose Storage	0	0	0	0	0	0	0	0	0
Quartermaster Storage	1	100	100	1	100	100	0	0	0
Hazmat Cleanup Storage	1	80	80	0	0	0	0	0	0
Maintenance Shop	1	150	150	1	150	150	1	150	150
Lawncare Storage	1	150	150	1	150	150	0	0	0
Building Support			1,330			686			100
Mechanical	1	300	300	1	120	120	1	50	50
Electrical	1	100	100	1	100	100	1	50	50
Communications	1	80	80	1	16	16	0	0	0
Sprinkler riser	1	50	50	1	50	50	0	0	0
Stairs	0	0	0	0	0	0	0	0	0
Firefighting Training	1	800	800	1	400	400	0	0	0
Exterior Areas									
Patio									
Generator Enclosure									
Mechanical Equipment									
Total Programmed Area (sf)			27,725			20,007			15,022
Circulation Factor (sf)		12%	3,327		12%	2,401		12%	1,803
Envelope Factor (sf)		12%	3,327		12%	2,401		12%	1,803
Building Foot Print (sf)			34,379			24,809			18,628

Site Feasibility Analysis



While it is not within the scope of this study to determine the optimal location of a new fire station, BKV Group did examine some potential options. One potential site that BKV Group has been made aware of is on State-owned property along School Road. The parcel is directly north of Station 102 and backs up to Heritage Village. The site appears to be very near the flood elevation but the building pad could be elevated with material removed for stormwater detention.

This parcel is approximately 7.5 acres, and would be sufficient to contain the entire footprint of the proposed project. The above figure shows the area required for program Option B in red, with the areas necessary for Option A shown dashed. The community room and associated spaces are shown here as a separate building with additional parking area indicated with dashed lines.

The site permits separate traffic movement for apparatus and personal vehicles with comfortable maneuvering clearances while leaving ample space for stormwater detention. The site allows for significant future expansion to both the apparatus bays and support spaces, as well as phased construction for the community room spaces and/or a potential live-burn training tower.

BKV Group also examined locating the new building in the center of Grafton, where the blocks are 300' square and there are few vacant parcels. Drive through apparatus bays with appropriate concrete aprons on each side would occupy half of a block (150'x300'), with the remaining building area and associated

parking filling the remaining portion. Stormwater detention would likely be underground in this scenario, and it is likely that some portions of the facility would end up on a second story, necessitating an elevator and staircases. Assembling land for a full block would likely force at least one existing business and/or multiple single-family homes to relocate.

The existing fire station sites are not large enough to accommodate the proposed facility. At Station 101, the new facility would need to overcome the proximity to the railroad tracks and the floodplain issue, and would require moving the water tower. Drive through apparatus bays would still be impossible to arrange. This figure shows the size of the apparatus bays *only* in comparison with the existing site boundaries.

At Station 102, the site width is not sufficient to accommodate enough bays across the front of the lot, nor is it sufficient to align the bays parallel with the street and provide the minimum apron depth to turn the aerial apparatus out of the station. This figure shows the size of the apparatus bays *only* in comparison with the existing site boundaries. If the adjacent parcel could be acquired, the station could fit, but it would require alternative stormwater accommodations, would be unable to support enough parking for the community room, and would exclude the possibility for future expansion.

Masterplanning Concepts

Early in the conceptualization process, most departments are unsure of their fundraising capabilities and their optimal facility size. To provide an idea of the spectrum of facility sizes found in fire stations across the country, BKV Group is showing three options. The final list of spaces in the facility will likely differ from these.

Option A: New Facility with Community Banquet Hall

Building area: 34,379 sf

Provides space for a fully functional fire station as well as space for a banquet hall to seat 800 people (with all associated restrooms, kitchens, mechanical, and storage elements). Amenities intended to help recruitment of new firefighters include a larger dayroom and a game room.

Option B: New Facility with Training Facility

Building area: 24,809 sf

Provides space for a fully functional fire station with a classroom to accommodate all staff, allowing the department to move out of the City Hall building. Provides space for hands-on training as well as physical fitness.

Option C: New Facility

Building area: 18,628 sf

Provides space for minimum functionality. Apparatus bays would have less maneuvering clearance so future apparatus would not be able to increase in size. Classroom training would still need to occur at City Hall, and there would be no build-in provisions for hands-on training. No fitness space would be provided.

Conceptual Project Schedule

Due to winter conditions, construction projects in North Dakota almost always start as the ground thaws in the spring. The following schedule durations may need to be adjusted depending upon what time of year the design effort gets underway.

Phase	Duration
Schematic Design	3 months
Design Development	2 months
Construction Documents	4 months
Bidding and Permitting	2 months
Construction	10 months

Conceptual Project Budget

Construction costs for fire stations vary regionally and based on construction type. The new fire station in Manvel is a simple metal building with virtually no site work. That station cost $113 per square foot ($950,000; 8,400 sf). Grand Forks Fire Station #5 is brick over concrete masonry and designed to blend with nearby houses. It cost $308 per square foot ($2,800,000; 9,092 sf).

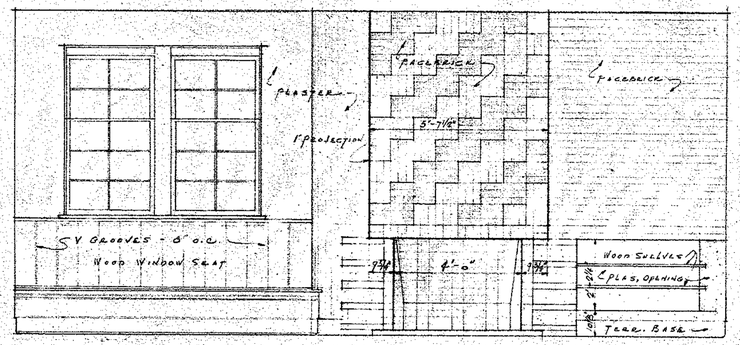
For the purposes of this cost estimate, we have assumed a new station located on the School Road site with a building area accommodating program Option B (24,809 sf) and a construction cost of $200 per square foot. This assumes construction starts in 2017. Escalation of 4% per year should be added if project will commence in later years.

Description of Expense	Estimated Cost
Land Acquisition and Sale (net)	$ 1
Demolition of Existing Structures	$ 0
Building Construction Cost	$ 5,000,000
Site Construction Cost	$ 400,000
Design Fee	$ 432,000
Site Survey	$ 5,000
Environmental Report	$ 2,500
Geotechnical Report	$ 7,500
Utilities Extension	$ 0
Furniture, Fixtures and Equipment	$ 80,000
Materials Testing	$ 18,000
Permitting and Approvals	$ 20,000
Owner's Project Contingency (~9%)	$ 535,000
TOTAL PROJECT	$ 6,500,000

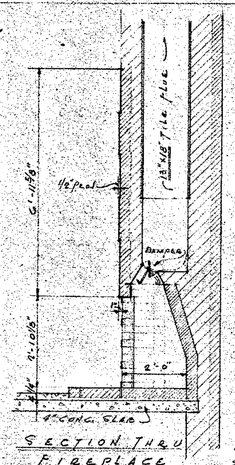
Appendix A – Existing Drawings

BKV Group was provided with existing drawings of Stations 101 and 102. These do not necessarily reflect the current conditions of the facility, but are attached to this report for informational purposes.

Note: Shaded portion shows 1/2" proj. in brick pattern. Entire panel proj. 1"

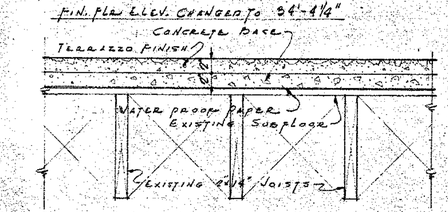


° E L E V A T I O N °
3/8" = 1'-0"

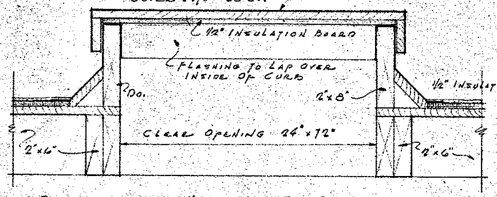


SECTION THRU FIREPLACE
3/8" = 1'-0"

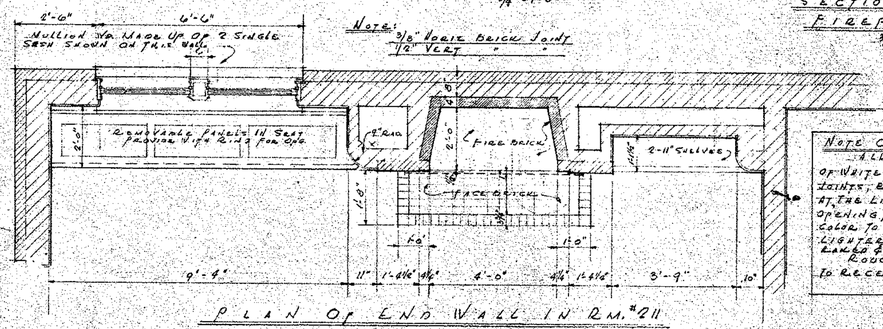
Note:
Fin. flr. elev. changed to 94'-4 1/4"



° ° FLOOR CONST OVER FIREHALL ° °
Scale: 1" = 1'-0"

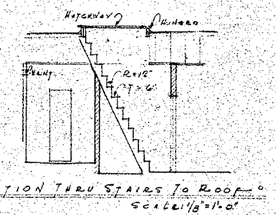


° ° DETAIL OF HATCH TO ROOF ° °
Scale: 1 1/2" = 1'-0"

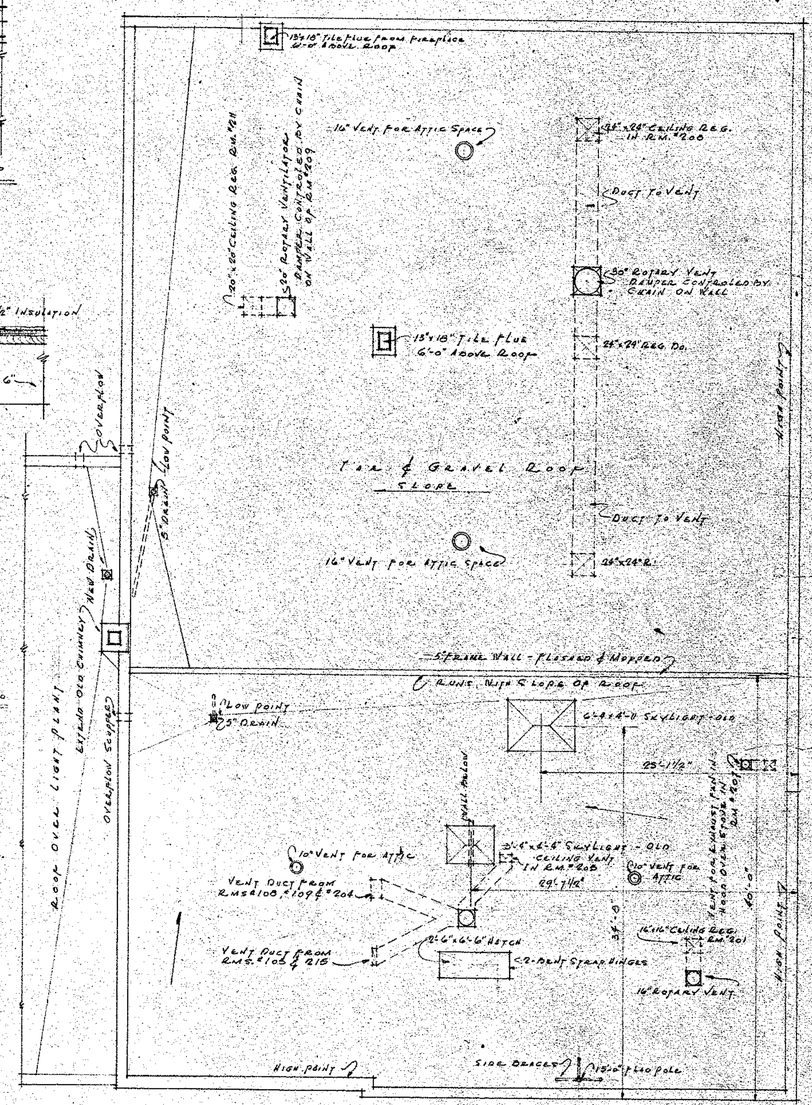


PLAN OF END WALL IN RM. #211
Scale: 3/8" = 1'-0"

Note concerning brick joint:
All horizontal joints to be of white mortar. All vertical joints, except those of rolok cas at the lintel over the fireplace opening, to be of colored mortar, color to match brick but of a lighter cast. Mortar joints to be raked & struck. Rough brickwork to be placed to receive 1/2" plaster coat.

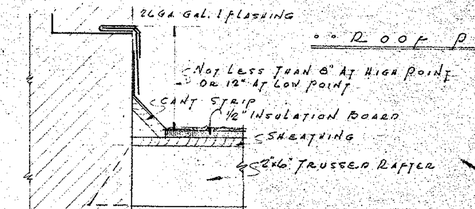


° SECTION THRU STAIRS TO ROOF °
Scale: 1/8" = 1'-0"

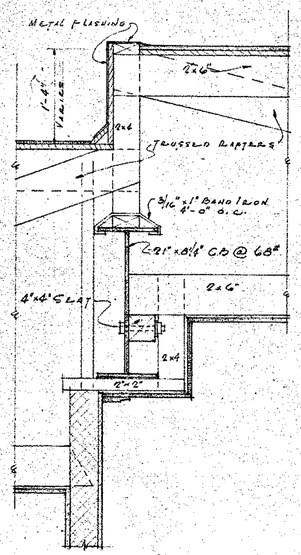


° ° ROOF PLAN ° °

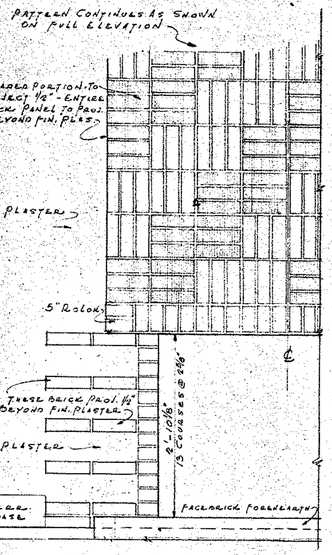
Note:
Skylights to have ceiling sash-glazed with obscure glass.



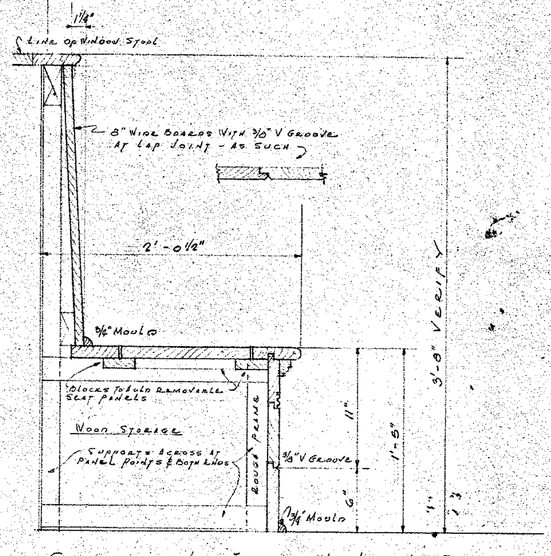
° DETAIL OF PARAPET FLASHING °
Scale: 1 1/2" = 1'-0"



° WALL BETWEEN ROOF LEVELS °
Scale: 1" = 1'-0"



PART DETAIL OF BRICKWORK AROUND HEARTH OPENING
Scale: 3/4" = 1'-0"

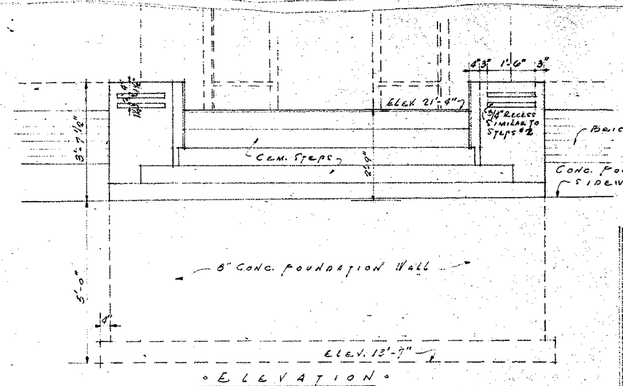


SECTION THRU WINDOW SEAT
Scale: 1 1/2" = 1'-0"

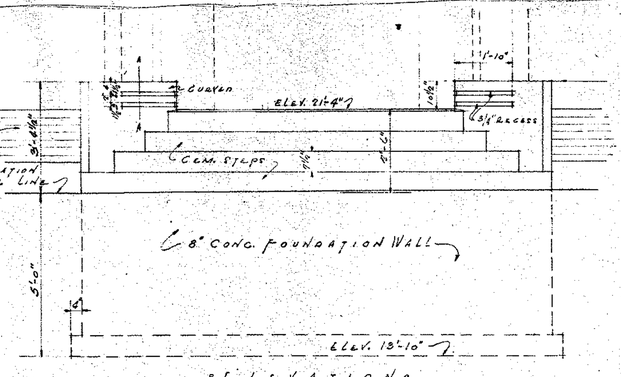
August 2, 1938

A CITY HALL FOR
CITY OF GRAFTON
GRAFTON, NO. DAK.

Job No. 3708	Theodore D. Wells	Sheet 5
W.P.& File 2305	Architect	
	Grand Forks, No. Dak.	



°ELEVATION°



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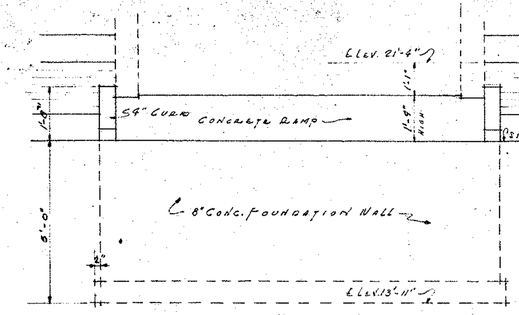
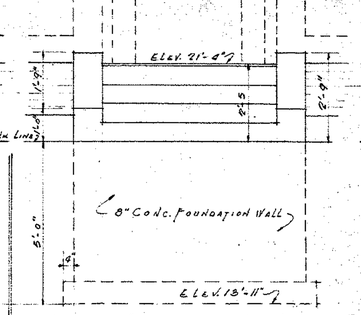
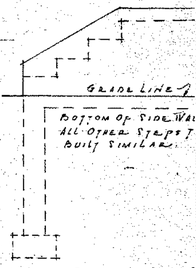


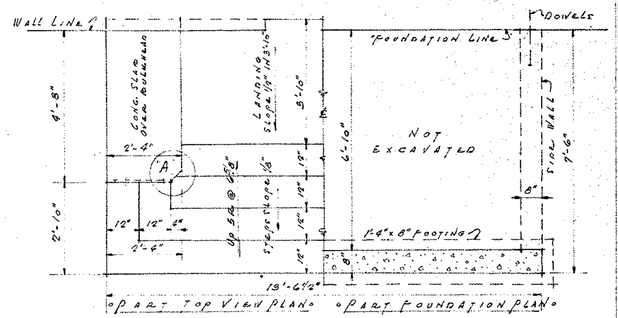
°ELEVATION°



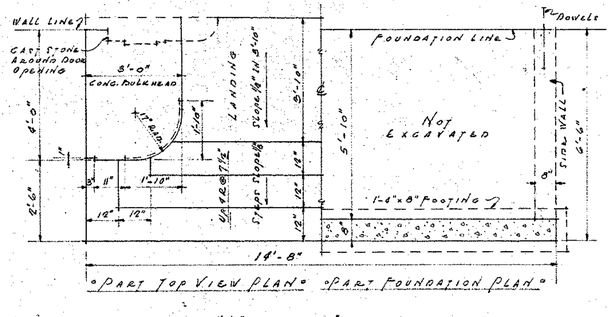
°ELEVATION°



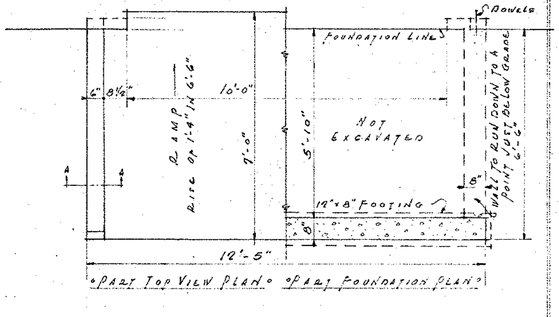
°SIDE ELEV.



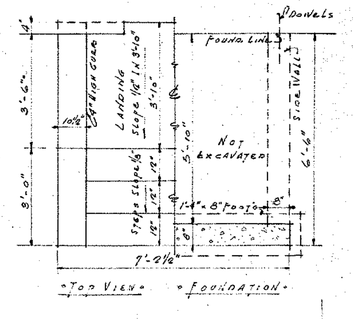
°PART TOP VIEW PLAN° °PART FOUNDATION PLAN°



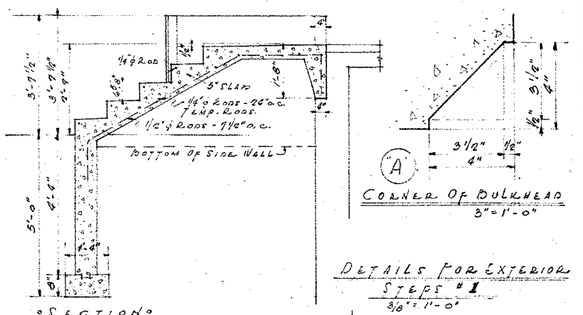
°PART TOP VIEW PLAN° °PART FOUNDATION PLAN°



°PART TOP VIEW PLAN° °PART FOUNDATION PLAN°

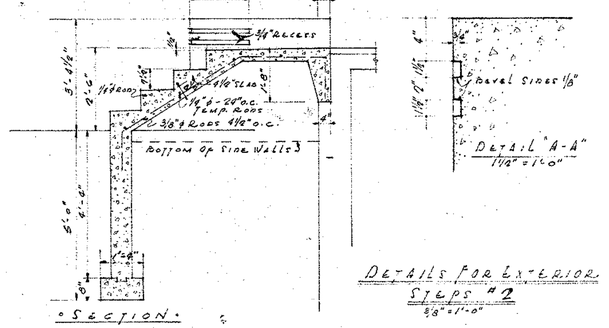


°TOP VIEW° °FOUNDATION°



DETAILS FOR EXTERIOR STEPS #1
3/8"=1'-0"

°SECTION°

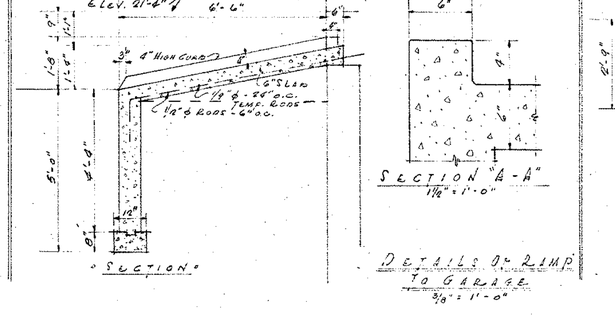


DETAILS FOR EXTERIOR STEPS #2
3/8"=1'-0"

°SECTION°

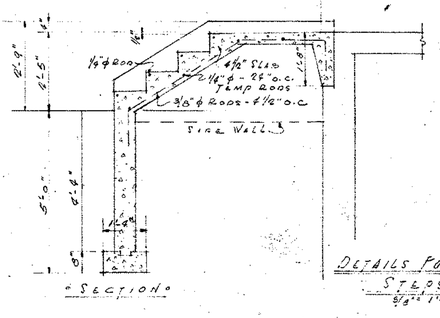
°°STAIR DETAILS°°

LOCATION SHOWN ON FLOOR PLANS



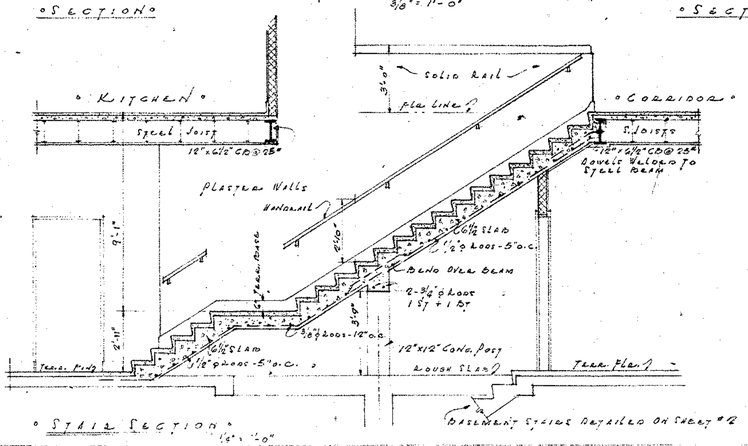
°SECTION°

DETAILS OF RAMP TO GARAGE
3/8"=1'-0"

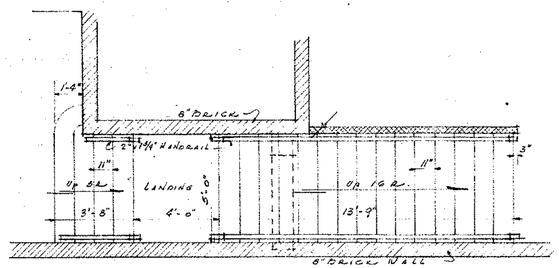


°SECTION°

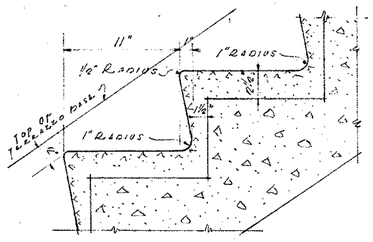
DETAILS FOR EXTERIOR STEPS #3
3/8"=1'-0"



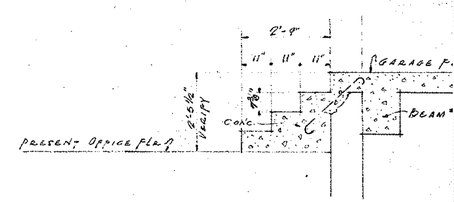
°STAIR SECTION°
½"=1'-0"



°PLAN OF STAIRS TO SECOND FLOOR°
SCALE: ¼"=1'-0"



°°TERRAZZO STAIR DETAIL°°
SCALE: 1½"=1'-0"

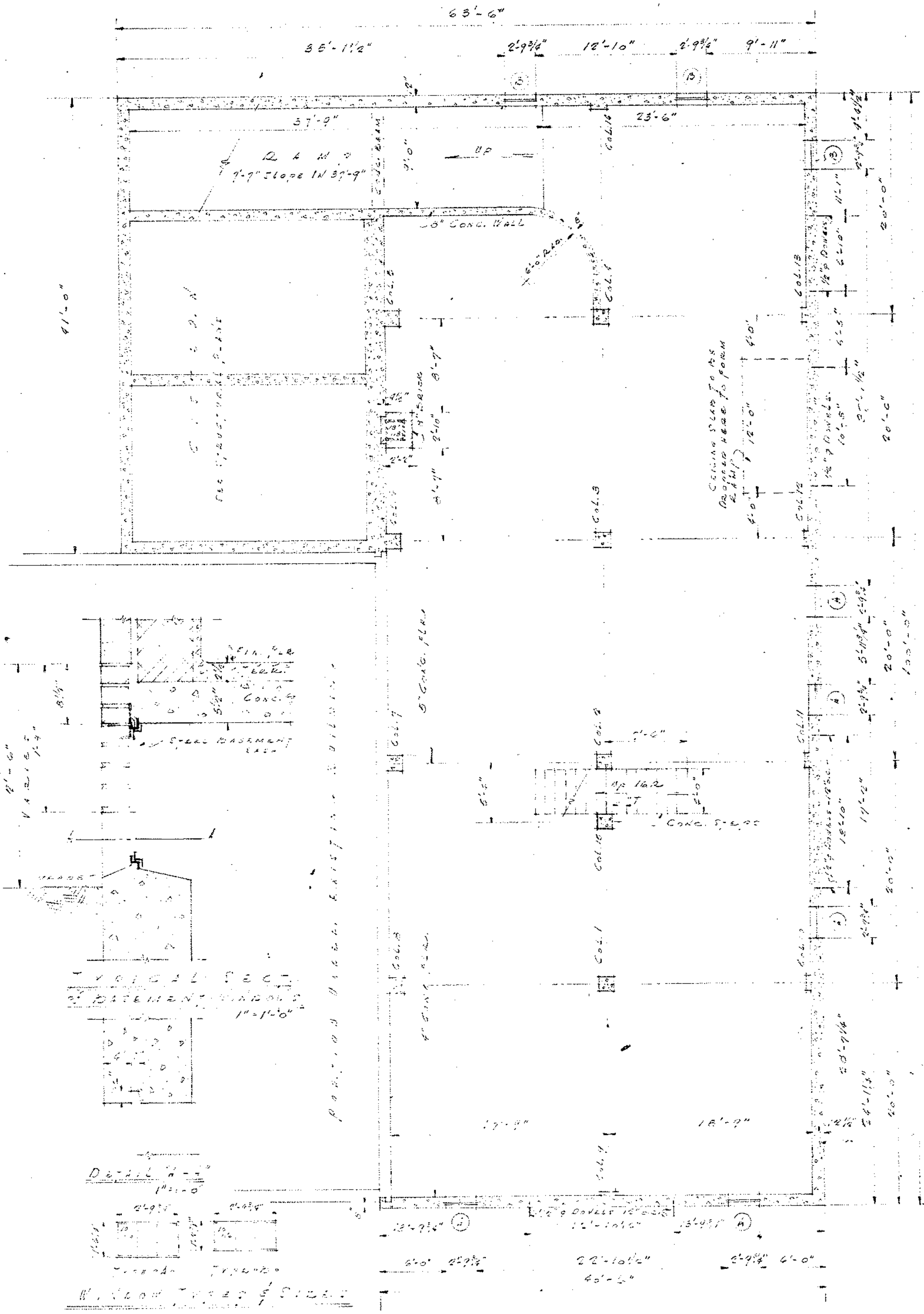


°STAIRS INTO OLD OFFICES°
SCALE: 3/8"=1'-0"

°CITY HALL FOR
°CITY OF GRAFTON
GRAFTON, NO. DAK.

PLAN No. 3703	THEODORE R. WELLS ARCHITECT
W.P.A. File 2852	GRAND FORKS, N.D.

APRIL 25, 1939



Basement Plan

Scale: ⅛" = 1'-0"

Feb. 12, 1953

A City Hall for City of Grafton
Grafton, N. Dak.

Job No. 5705
N.D.A. File 2545

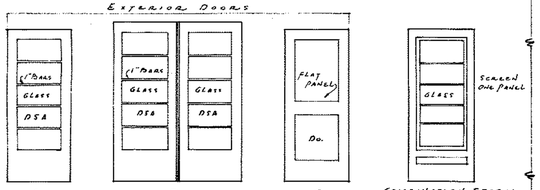
Theodore B. Wells
Architect
Grand Forks, N.D.

Sheet 3A

ROOM FINISH SCHEDULE

NO	NAME	FLOOR	BASE	WALLS	CEILING
		"FIRST FLOOR"			
101	VESTIBULE	TERRAZZO	6" TERR.	PLAS.	PLAS.
102	L.F.W. DEPT.	Do.	Do.	Do.	ACOUSTIC TILE
103	VAULT	Do.	Do.	Do.	PLAS.
104	LEST ROOM	Do	Do.	Do.	ACOUSTIC TILE
105	TOILET	DO.	Do.	Do.	PLAS.
106	CLOSET	Do.	Do.	Do.	Do.
107	OFFICE	Do.	Do.	Do.	ACOUSTIC TILE
108	WOMENS TOILET	Do.	Do.	Do.	PLAS.
109	MENS TOILET	DO.	Do.	Do.	Do
110	HALL	Do	Do.	Do.	Do.
111	ENTRY	Do.	Do.	Do.	Do.
112	GARAGE	CEMENT	NONE	UNFINISHED	Do.
113	POLICE OFFICE	Do.	CEMENT	PLAS.	Do.
114	RECEIVING R.M.	Do.	Do.	Do.	Do.
115	CELLS	Do.	Do.	Do.	Do.
116	WAREHOUSE	Do	Do.	UNFINISHED	UNFINISHED
117	RAMP	Do.	Do.	Do	PART FIN.
118	JANITORS CLOS	Do.	Do.	PLAS.	PLAS.
		"SECOND FLOOR"			
201	COUNCIL ROOM	TERRAZZO	6" TERR.	PLAS.	ACOUSTIC TILE
202	OFFICE	Do.	Do.	Do.	Do.
203	COAT ROOM	Do.	Do.	Do.	PLAS.
204	MENS TOILET	Do.	Do.	6"-6" TERR. WAIN. PLAS.	Do.
205	WOMENS TOILET	Do.	Do.	PLAS.	Do.
206	CORRIDOR	Do	Do.	Do.	ACOUSTIC TILE
207	KITCHEN	Do.	Do.	Do.	Do.
208	ASSEMBLY	MAPLE	WOOD	Do.	Do.
209	LOBBY	TERRAZZO	6" TERR.	Do.	Do.
210	STORAGE	Do.	Do.	Do.	Do.
211	LEGION ROOM	Do.	Do.	Do.	Do.
212	HALL	Do.	Do.	Do.	Do.
213	FIREMENS STOR.	Do.	Do.	Do	Do.
214	DORMITORY	Do.	Do.	Do	Do.
215	BATH	Do.	Do.	Do.	PLAS.
216	LOUNGE	Do.	Do.	Do.	ACOUSTIC TILE
217	STAIRS TO ROOF	Do	Do.	UNFINISHED	NONE
218	BROOM CLOSET	Do.	DO.	PLAS.	PLAS.

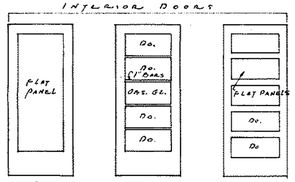
EXTERIOR DOORS



"A" "B" "C"

COMBINATION STORM & SCREEN DOOR FOR ENTRANCES "B" & "C"

INTERIOR DOORS

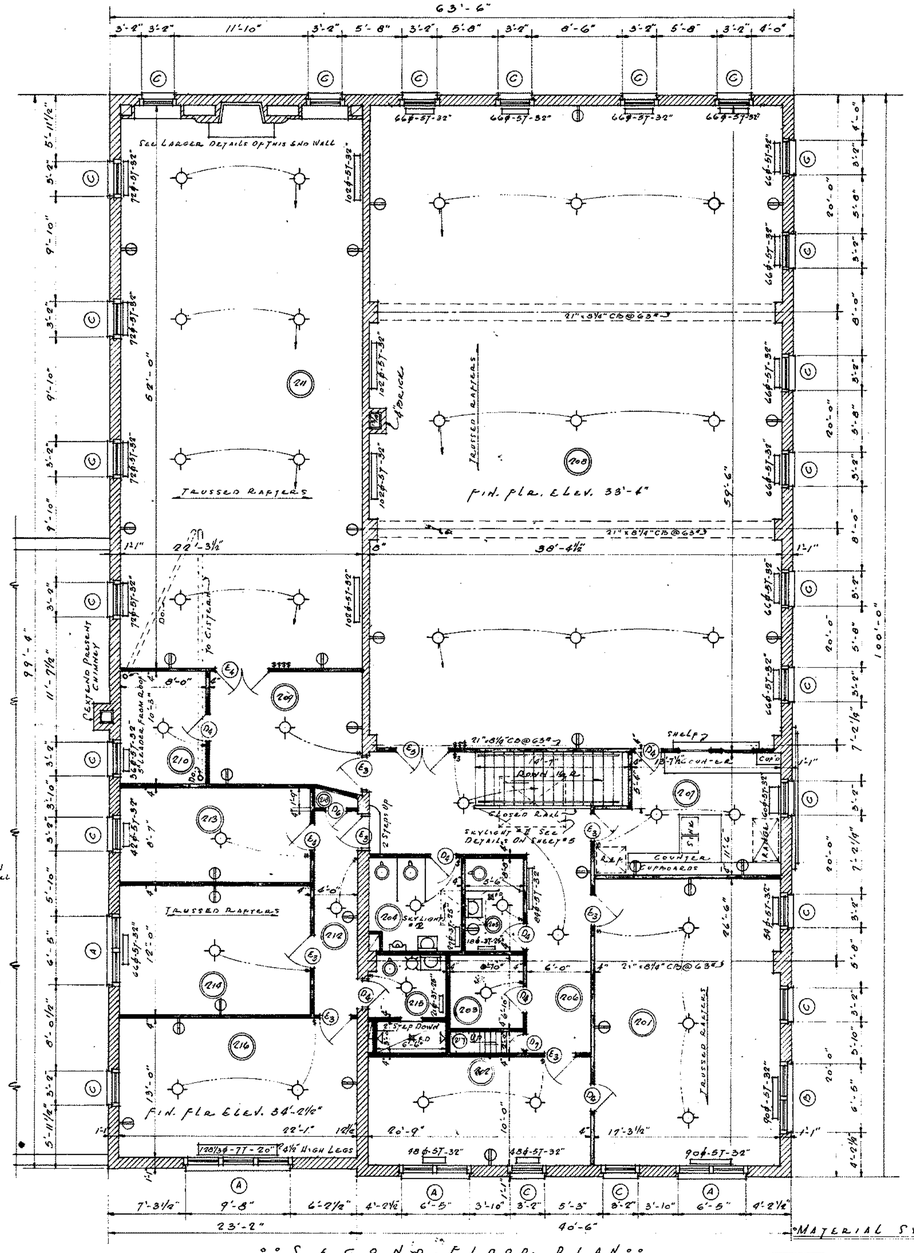


"D" "E" "F"

SIZES	
NO	SIZE
1	3'-0" x 7'-4" x 2 1/4"
2	3'-0" x 7'-0" x 2 1/4"
3	3'-0" x 7'-0" x 1 3/4"
4	2'-6" x 7'-0" x 1 3/4"
5	2'-4" x 7'-0" x 1 3/4"
6	2'-0" x 7'-0" x 1 3/8"
7	1'-6" x 7'-0" x 1 3/8"

NOTE: ALL DOORS TO HAVE OVOLO STICKING

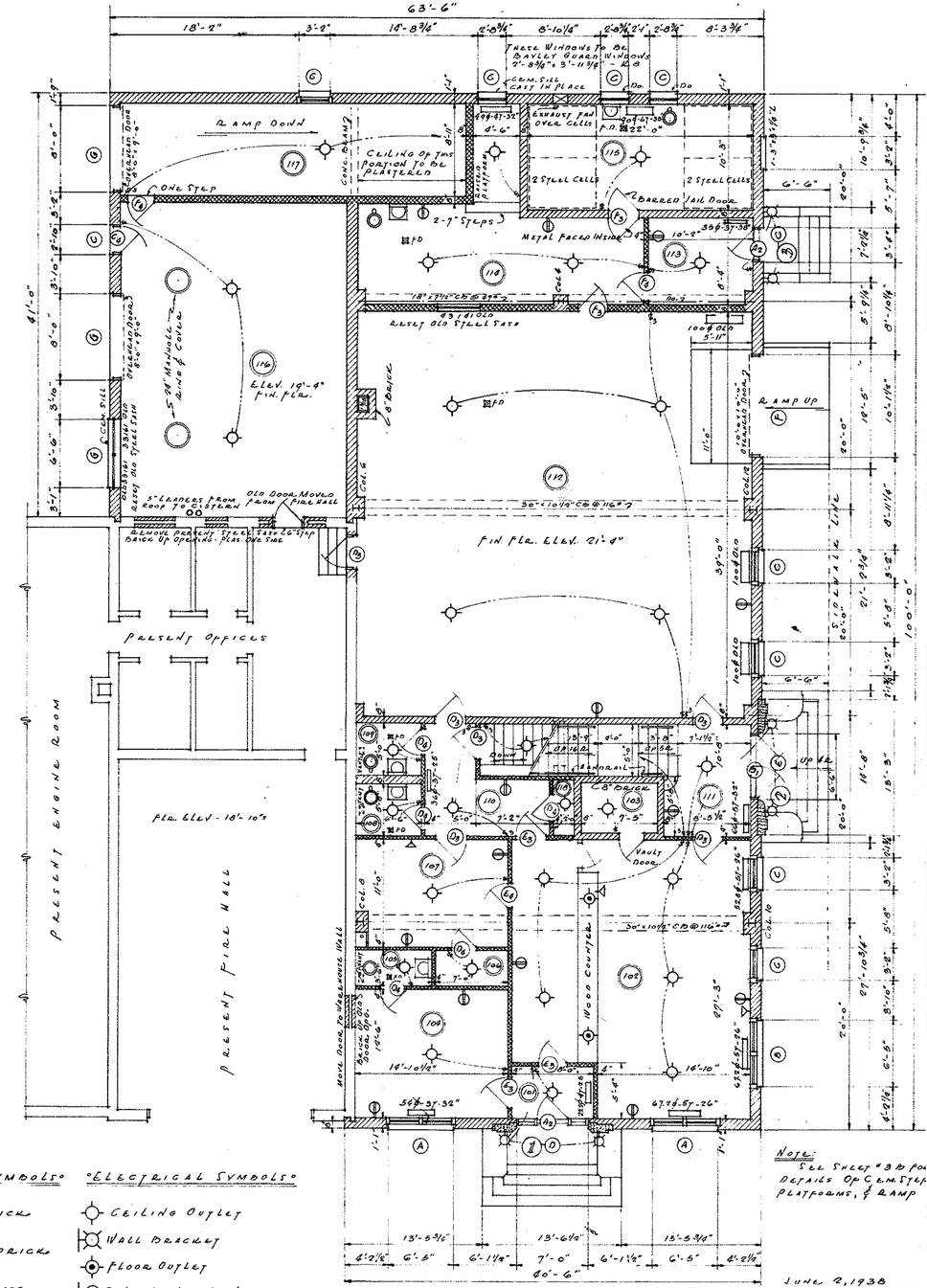
DOOR TYPES & SIZES



"SECOND FLOOR PLAN"

SCALE: 1/8" = 1'-0"

NOTE: ALL BRICK PILASTERS ON 2nd FLOOR TO HAVE 8 1/2" PROJ. - 2'-0" WIDE. SEE SHEET #8 FOR DIMENSIONS FOR PILASTERS ON 1st FLOOR



"FIRST FLOOR PLAN"

SCALE: 1/8" = 1'-0"

NOTE: SEE SHEET #3 FOR DETAILS OF CEM. STEPS, PLATFORMS, & RAMP

NOTE: SYMBOLS AT ALL EXTERIOR WALL OPENINGS INDICATE LINTEL TYPES & SIZES - SEE SHEET #

"MATERIAL SYMBOLS"

- FACE BRICK
- COMMON BRICK
- STONE - CAST
- HOLLOW BRICK
- CONCRETE
- HOLLOW TILE

"ELECTRICAL SYMBOLS"

- CEILING OUTLET
- WALL BRACKET
- FLOOR OUTLET
- CONVENIENCE OUTLET
- TELEPHONE
- SWITCH - SINGLE
- SWITCH - 3 WAY

JUNE 2, 1938

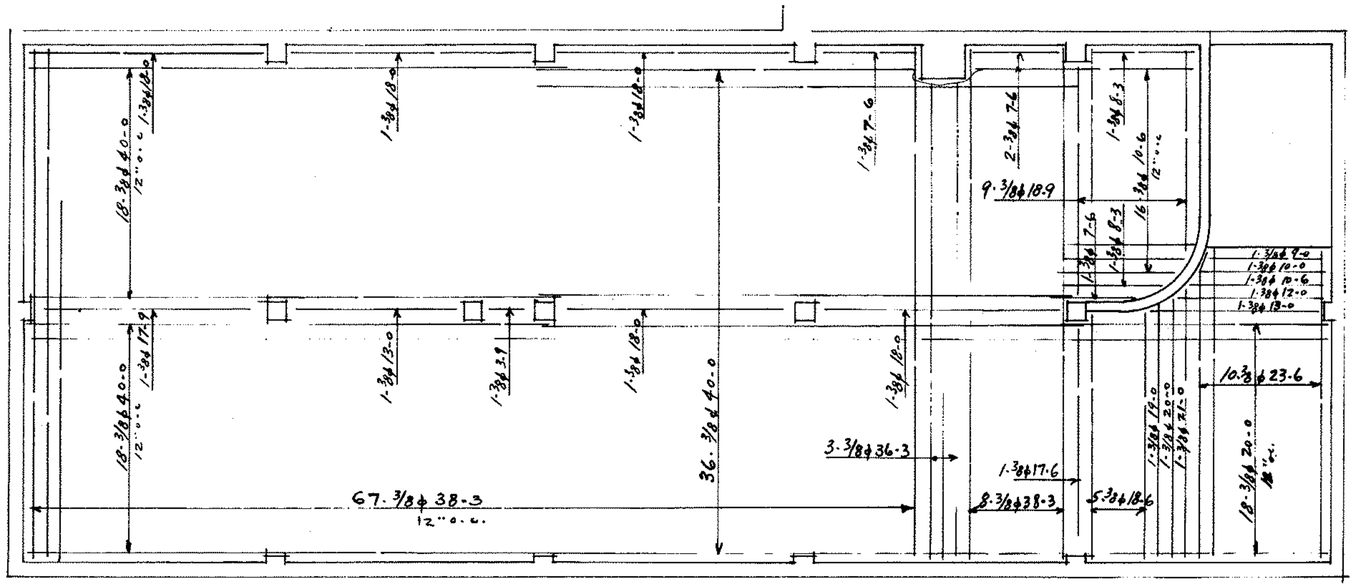
A CITY HALL FOR CITY OF GRAFTON

GRAFTON, NO. DAK.

PLAN NO 3703
WPA FILE 2305

THEODORE B. WELLS ARCHITECT
GRAND FORKS, N.D.

SHEET 4



BASEMENT FLOOR

BEAMS

B1 + B5, 14x26, 2 THUS
2-1ϕ 19-3
2-1ϕ 26-2 B1
18-3/8ϕ 5-6 T1
2" 2@5, 3@6, 9, 12, 16
4-144 BM. CHAIRS

B2 + B9 14x26 2 THUS
2-1ϕ 19-3
2-1ϕ 26-2 B1
9-3/8ϕ 5-6 T1
9-3/8ϕ 5-4 T2
2" 2@5, 3@6, 9, 12, 16
4-144

B3 14x20
2-7/8ϕ 14-8
2-7/8ϕ 21-4 B3
14-3/8ϕ 4-6 T3
2, 3-5, 6, 9, 12
2-144

B4 14x26
2-1ϕ 19-4
2-1ϕ 25-6 B4
18-3/8ϕ 5-6 T1
2" 2@5, 3@6, 9, 12, 16
4-144

B6 14x20
2-3/4ϕ 19-6
2-7/8ϕ 26-1 B6
18-3/8ϕ 4-4 T4
2, 2-5, 3-6, 9, 12, 16
4-144

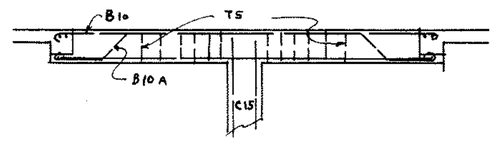
B7 14x20
2-3/4ϕ 20-0
2-7/8ϕ 30-11 B7
18-3/8ϕ 4-4 T4
2, 2@5, 3-6, 9, 12, 16
4-144

B8 14x20
2-3/4ϕ 20-0
2-7/8ϕ 30-11 B7
18-3/8ϕ 4-4 T4
2, 3-5, 6, 9, 12
4-144

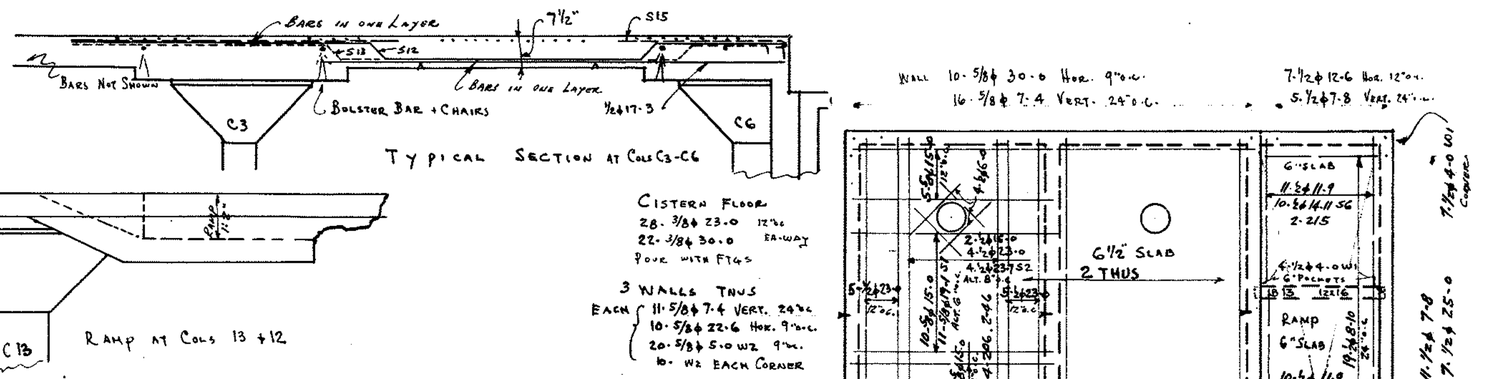
B10 10x14
1-3/4ϕ 15-6 B10 Top over Col.
1-3/4ϕ 16-1 B10A Top " "
2-1/2ϕ 14-0 BOTTOM
10-3/8ϕ 3-0 T5
2" 3@6", 9, 9" EACH SIDE COL.
2-103

B11 + B12 10x10 2 THUS
2-3/4ϕ 8-0 B11 Top
LAP INTO FLAT SLAB
2-1/2ϕ 5-3 BOTTOM
5-3/8ϕ 2-4 T6
2, 6, 3@12" FROM B2-B9
2-103

B13 12x16
1-7/8ϕ 9-8
1-7/8ϕ 11-10 B13
10-3/8ϕ 3-5 T7
3, 6, 9, 9, 12
2-123



BEAM B10



TYPICAL SECTION AT COLS C3-C6

CISTERN FLOOR
28-3/8ϕ 23-0 12"o.c.
22-3/8ϕ 30-0 EA. WAY
POUR WITH FTGS

3 WALLS THUS
EACH { 11-5/8ϕ 7-4 VERT. 24"o.c.
10-5/8ϕ 22-6 HOR. 9"o.c.
20-5/8ϕ 5-0 W2 9"o.c.
10-W2 EACH CORNER

WALL 10-5/8ϕ 30-0 HOR. 9"o.c.
16-5/8ϕ 7-4 VERT. 24"o.c.
7-½ϕ 12-6 HOR. 12"o.c.
5-½ϕ 7-8 VERT. 24"o.c.

FOUNDATION & 1ST. FLOOR PLAN

BASEMENT COLUMNS

C1, C3, C11, C13, C15
5 THUS 16x16"
4-3/4ϕ 9-8
9-1/4ϕ 4-3 T12 12"o.c.

C2, C4, C6, C8
4 THUS 16x16
8-7/8ϕ 9-8
1-1/4ϕ 13-13/4 x 9-8 E1

C5-C7
2 THUS 16x16
6-7/8ϕ 9-8
1-1/4ϕ 13-2 1/8 x 9-8 E2

C9, C14
2 THUS 16x16"
4-5/8ϕ 9-8
9-1/4ϕ 4-3 T12 12"o.c.

C10, C12
2 THUS 16x16
4-7/8ϕ 9-8
15-1/4ϕ 4-3 T12, 8"o.c.

STOCK FOR LINTELS, ETC.
10-½ϕ 30-0

ORDER OF PLACING FLAT SLAB REINFORCING.
1ST: COLUMN BANDS ↕ WITH
4 BOLSTERS "A"
EACH 2-5/8ϕ 4-6, 4-CHS, CHAIRS
1 BOLSTER "B"
2-5/8ϕ 4-6, 2-CH8½, 2-CHS
4 BOLSTERS C
EACH 2-5/8ϕ 9-6, 4-CH5, 2-CH8½
2 BOLSTERS "D"
EACH 2-5/8ϕ 9-6 4-CH5, 2-CH8½
1 BOLSTER E
2-5/8ϕ 4-6 4-CH8½
2ND- COLUMN BANDS ↔
3RD - MIDDLE BANDS ↕
7 BOLSTERS F
EACH 2-5/8ϕ 9-6 6-CH5½
1 BOLSTER G
2-5/8ϕ 9-6 6-CH9
4TH MIDDLE BANDS ↔
8 BOLSTERS H
EACH 2-5/8ϕ 9-6 6-CH5½

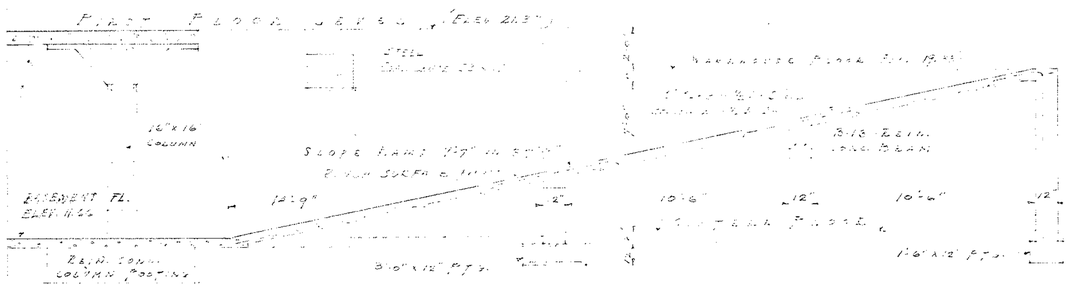
BETHLEHEM STEEL CO.
ST. PAUL, MINN. OFFICE
JOB CITY HALL
ORWG. COVERS BSMT. AND FIRST FLOOR
LOCATION GRAFTON, N.D.
ARCHITECT THEODORE B. WELLS
CONTRACTOR
MADE BY R.S.R. CHECKED BY
DATE JAN. 26, 1938 REVISED
7270 R-1 of 1

REINFORCING STEEL

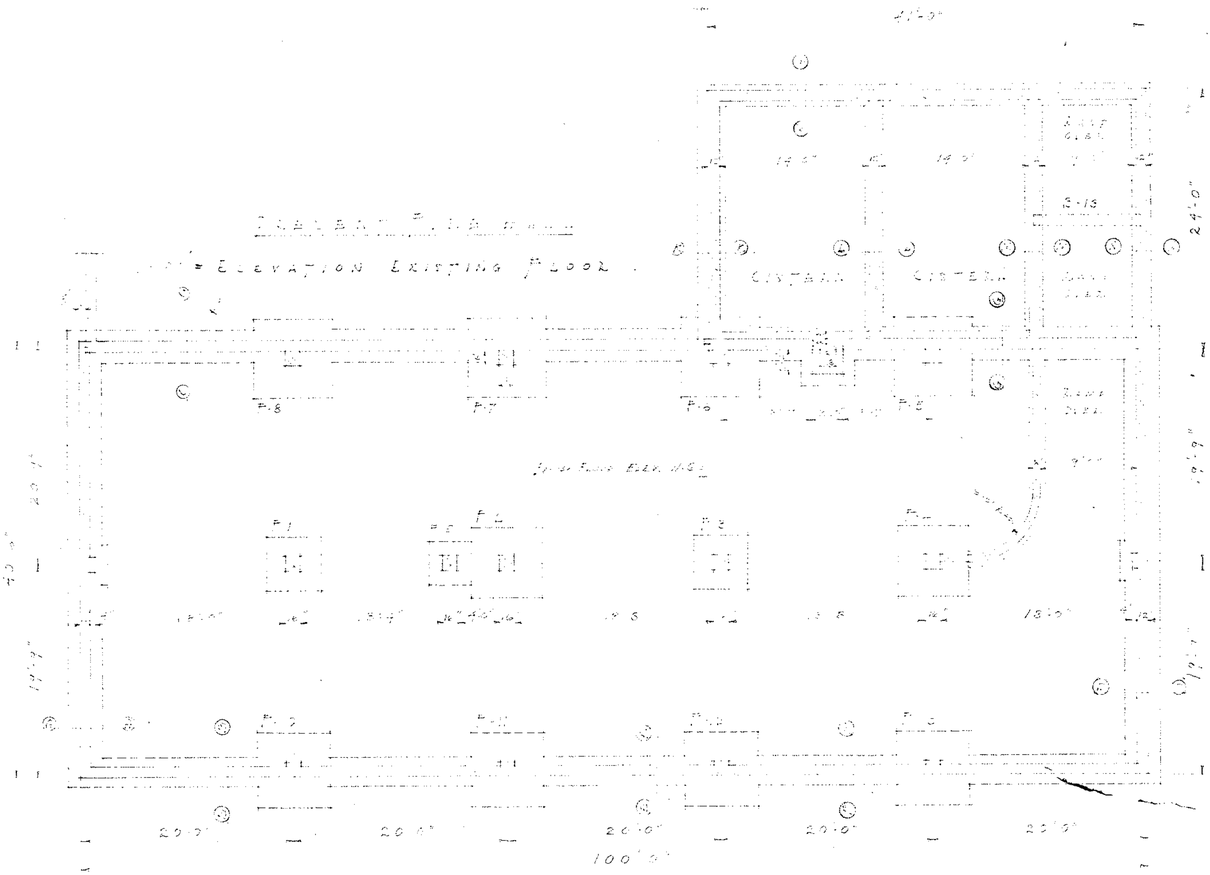
FOOTING SCHEDULE

FTG. MARK	NO. BARS EACH DIRECTION	FOOTING WIDTH	REINF. BAR SIZE	NUMBER PER BAR	SPACING	LENGTH	WIDTH	DEPTH	FTG. MARK
F 1	9	18"	½" ø	5	2'-0"	30"	5'-0"	18"	F 1
F 2	15	30"	½" ø	7	1'-6"	34"	6'-8"	20"	F 2
F 3	9	18"	½" ø	5	2'-0"	30"	5'-0"	18"	F 3
F 4	15	30"	½" ø	7	1'-6"	34"	6'-8"	20"	F 4
F 5	16	32"	½" ø	8	1'-6"	34"	7'-0"	20"	F 5
F 6	16	32"	½" ø	8	1'-6"	34"	7'-4"	20"	F 6
F 7	16	32"	½" ø	8	1'-6"	34"	7'-0"	20"	F 7
F 8	16	32"	½" ø	8	1'-6"	34"	7'-4"	20"	F 8
F 10	16	32"	½" ø	8	1'-6"	34"	7'-0"	20"	F 10
F 11	15	30"	½" ø	7	1'-6"	34"	6'-8"	20"	F 11
F 12	16	32"	½" ø	8	1'-6"	34"	7'-0"	20"	F 12
F 13	15	30"	½" ø	7	1'-6"	34"	6'-8"	20"	F 13
F 3	5	10"	½" ø	3	3'-0"	34"	2'-0"	12"	F 3

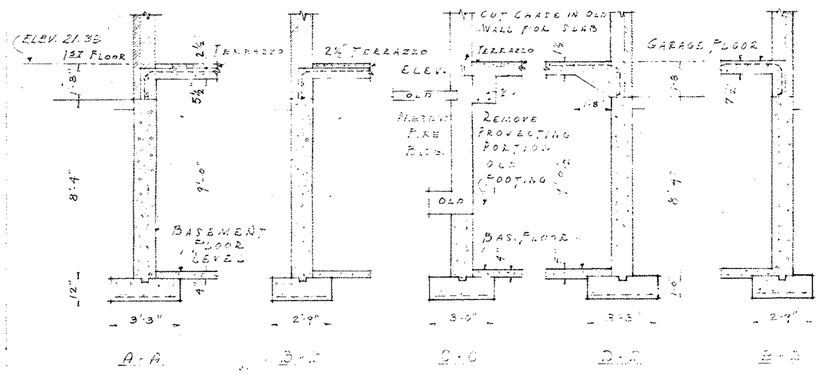
NOTE: [illegible]

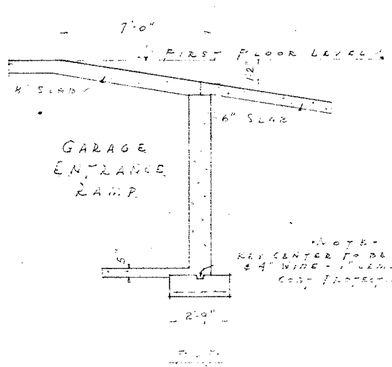


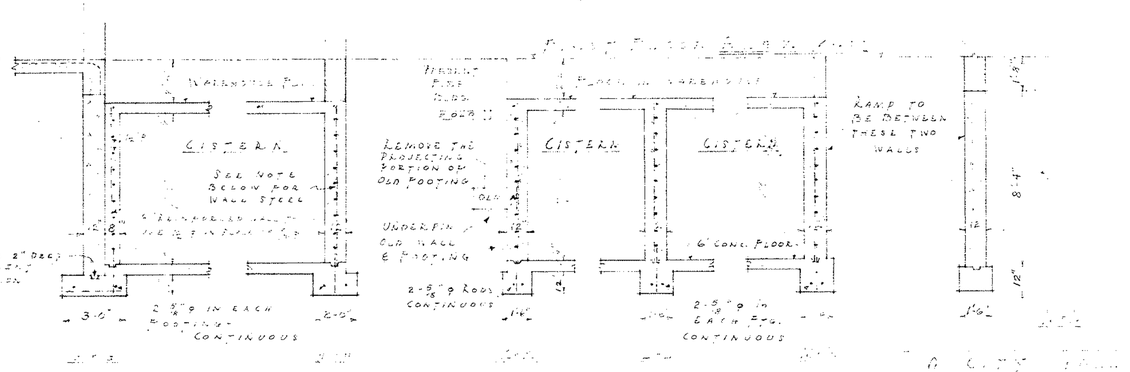
SECTION THRU RAMP & CISTERN - SCALE ¼"=1'-0"



BASEMENT FLOOR PLAN FOOTING LAYOUT
SCALE - ⅛" = 1'-0"







NOTE: [illegible]

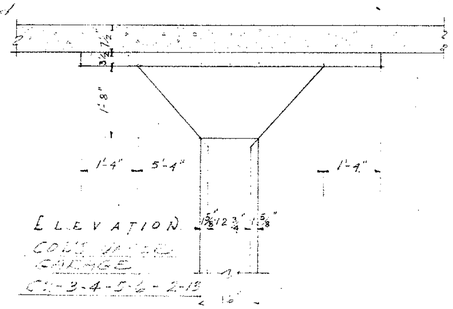
BEAM SCHEDULE

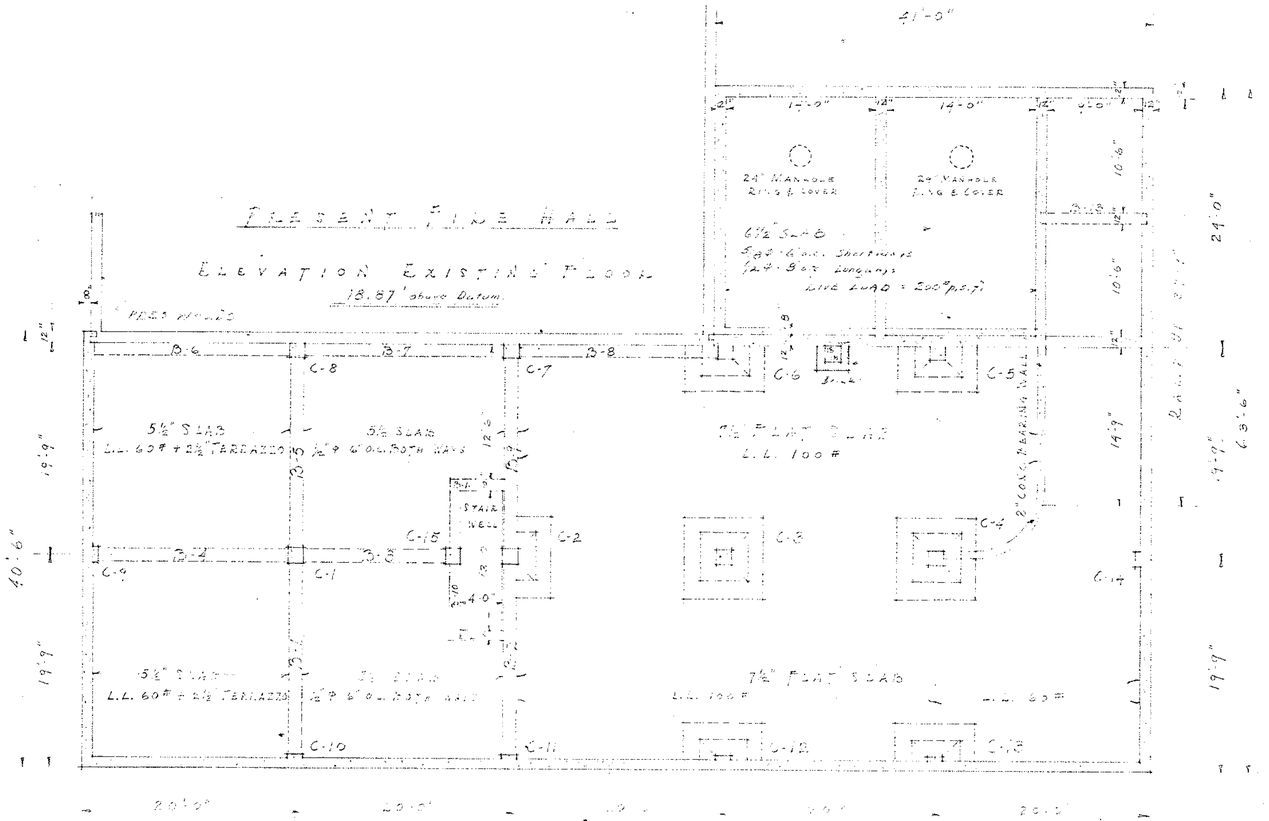
BEAM MARK	SIZE	REINFORCING STEEL: STRAIGHT	BENT
B-1	14"x26"	2-1" ϕ	2-1" ϕ
B-2	14"x26"	2-1" ϕ	2-1" ϕ
B-3	14"x20"	2-⅞ ϕ	2-⅞ ϕ
B-4	14"x26"	2-1" ϕ	2-1" ϕ
B-5	14"x26"	2-1" ϕ	2-1" ϕ
B-6	14"x20"	2-¾ ϕ	2-⅞ ϕ
B-7	14"x20"	2-¾ ϕ	2-⅞ ϕ
B-8	14"x20"	2-¾ ϕ	2-⅞ ϕ
B-9	14"x26"	2-1" ϕ	2-1" ϕ
B-10	10"x14"	1-¾ ϕ	1-¾ ϕ
B-11	10"x10"	1-¾ ϕ	1-¾ ϕ
B-12	10"x10"	1-¾ ϕ	1-¾ ϕ
B13	12"x16"	1-⅞ ϕ	1-⅞ ϕ

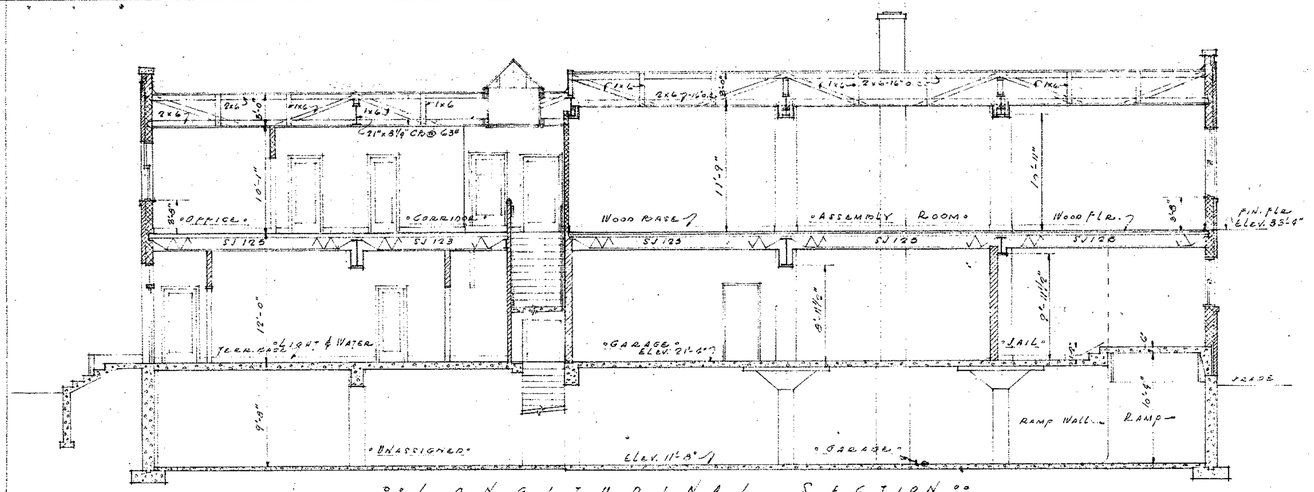
COLUMN SCHEDULE

COL. MARK	SIZE	VERTICAL STEEL: NUMBER OF RODS	SIZE	LENGTH	TIES & HOOPS
C-1	16"x16"	4	-¾" ϕ	9-10	12" CORE - ¼" ϕ TIES @ 12" O.C.
C-2	16"x16"	8	⅞" ϕ	do	13" CORE - 5/16" ϕ HOOPS - 2" PITCH
C-3	16"x16"	4	¾" ϕ	do	12" CORE - ¼" ϕ TIES - @ 12" O.C.
C-4	16"x16"	8	⅞" ϕ	do	13" CORE - 5/16" ϕ HOOPS - 2" PITCH
C-5	16"x16"	6	⅞" ϕ	do	13" CORE - 5/16" ϕ HOOPS - 2" PITCH
C-6	16"x16"	8	⅞" ϕ	do	13" CORE - 5/16" ϕ HOOPS - 2" PITCH
C-7	16"x16"	6	⅞" ϕ	do	13" CORE - 5/16" ϕ HOOPS - 2" PITCH
C-8	16"x16"	8	⅞" ϕ	do	13" CORE - 5/16" ϕ HOOPS - 2" PITCH
C-9	16"x16"	4	⅝" ϕ	do	12" CORE - ¼" ϕ TIES - 12" O.C.
C-10	16"x16"	4	⅞" ϕ	do	12" CORE - ¼" ϕ TIES - 8" O.C.
C-11	16"x16"	4	¾" ϕ	do	12" CORE - ¼" ϕ TIES - 12" O.C.
C 12	16"x16"	4	⅞" ϕ	do	12" CORE - ¼" ϕ TIES - 8" O.C.
C-13	16"x16"	4	¾" ϕ	do	12" CORE - ¼" ϕ TIES - 12" O.C.
C-14	16"x16"	4	⅝" ϕ	do	12" CORE - ¼" ϕ TIES - 12" O.C.
C-15	16"x16"	4	¾" ϕ	do	12" CORE - ¼" ϕ TIES - 12" O.C.

NOTE:-
All details of Design and fabrication and Bending shall meet the requirements of the Minneapolis Building Ordinance. and Shop Drawings shall be submitted to Architect for approval.
Provide all bolsters, stirrups, dowels, tie wires, temperature rods, etc. as required.
Provide 300 lin. feet of ½"ϕ ¼ to be cut on job for reinforcing around windows, stairways, etc. as directed
All steel shall be intermediate grade @ 18000 lbs.

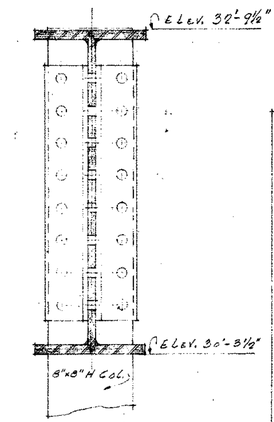




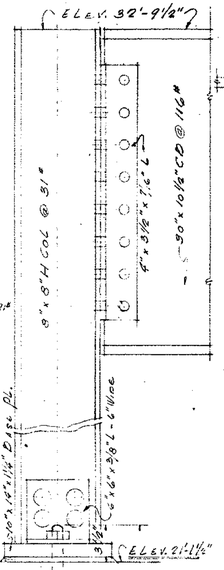


"LONGITUDINAL SECTION"

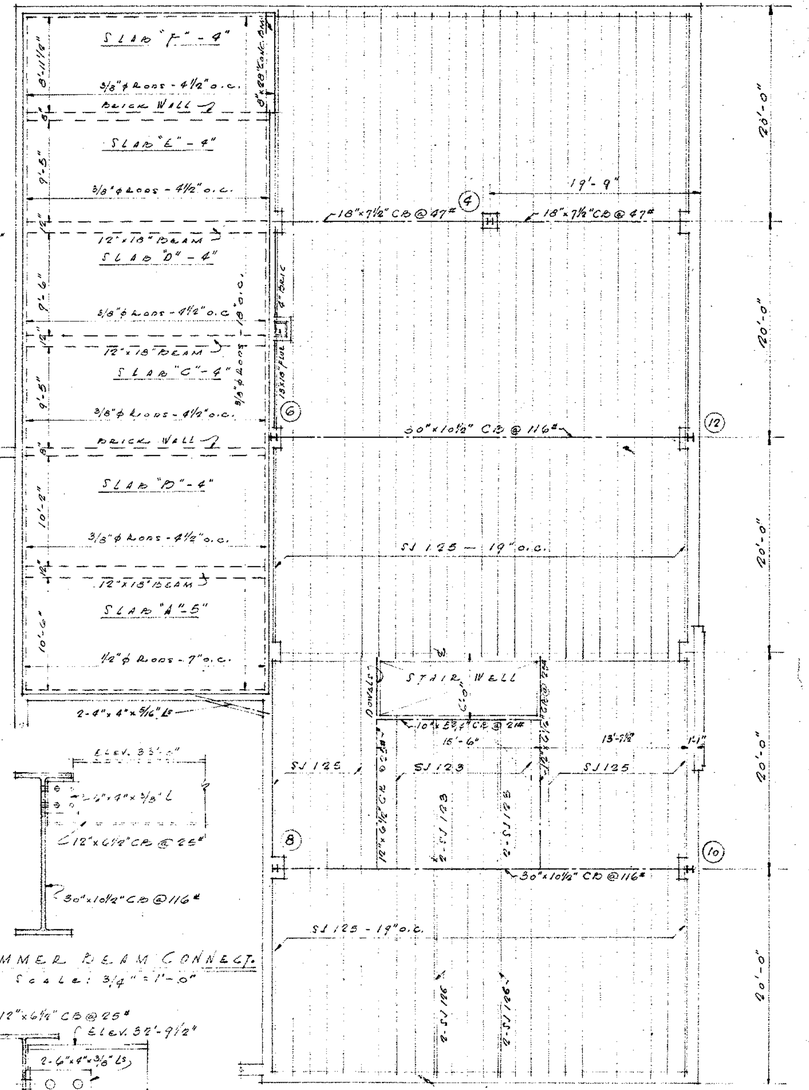
SCALE 1/8" = 1'-0"



"END ELEV."

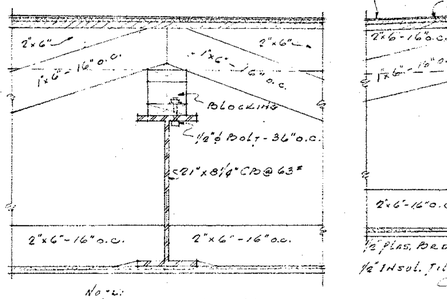


"PLAN"



"SECOND FLOOR FRAMING PLAN"

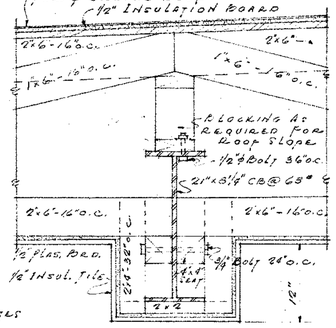
SCALE 1/8" = 1'-0"

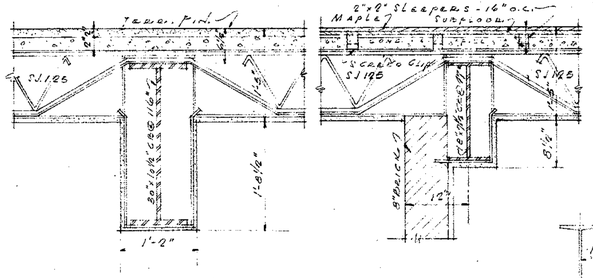


NOTE: PROVIDE 12"x16"x5/16" BEARING PLATES FOR EACH OF THE 21" CB.

"TYPICAL ROOF FRAMING DETAILS"

SCALE: 1" = 1'-0"



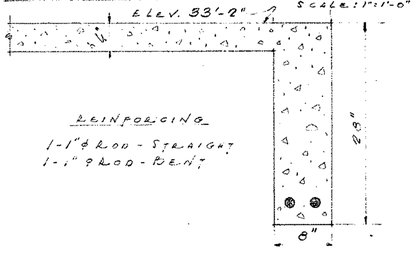


"TYPICAL 2nd FLOOR FRAMING"

SCALE: 3/4" = 1'-0"

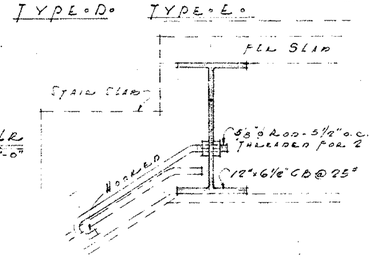
TYPICAL CONCRETE BEAM - 2nd FLR

SCALE: 1" = 1'-0"



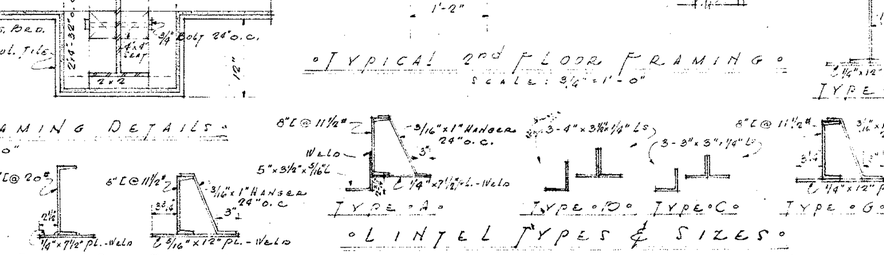
CONCRETE BEAM OVER RAMP

SCALE: 1" = 1'-0"

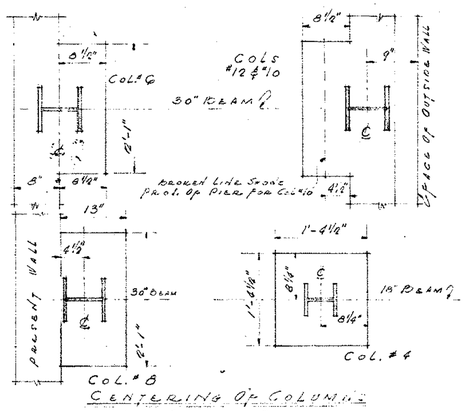


DETAIL OF STEEL BEAM AT 2nd FLR. STAIR LANDING

SCALE: 1½" = 1'-0"

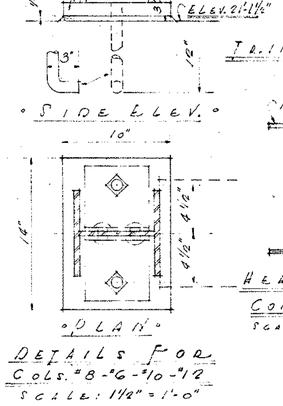


"LINTEL TYPES & SIZES"



CENTERING OF COLUMNS IN BRICK PIERS

SCALE: 3/4" = 1'-0"

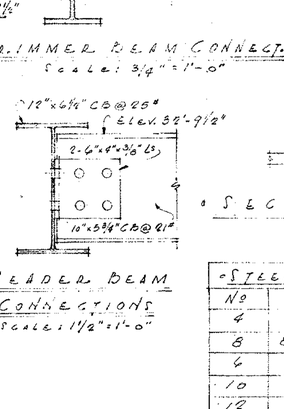


"SIDE ELEV."

"PLAN"

DETAILS FOR COLS. #8-#6-#10-#12

SCALE: 1½" = 1'-0"



HEADER BEAM CONNECTIONS

SCALE: 1½" = 1'-0"

TIMMER BEAM CONNECT.

SCALE: 3/4" = 1'-0"

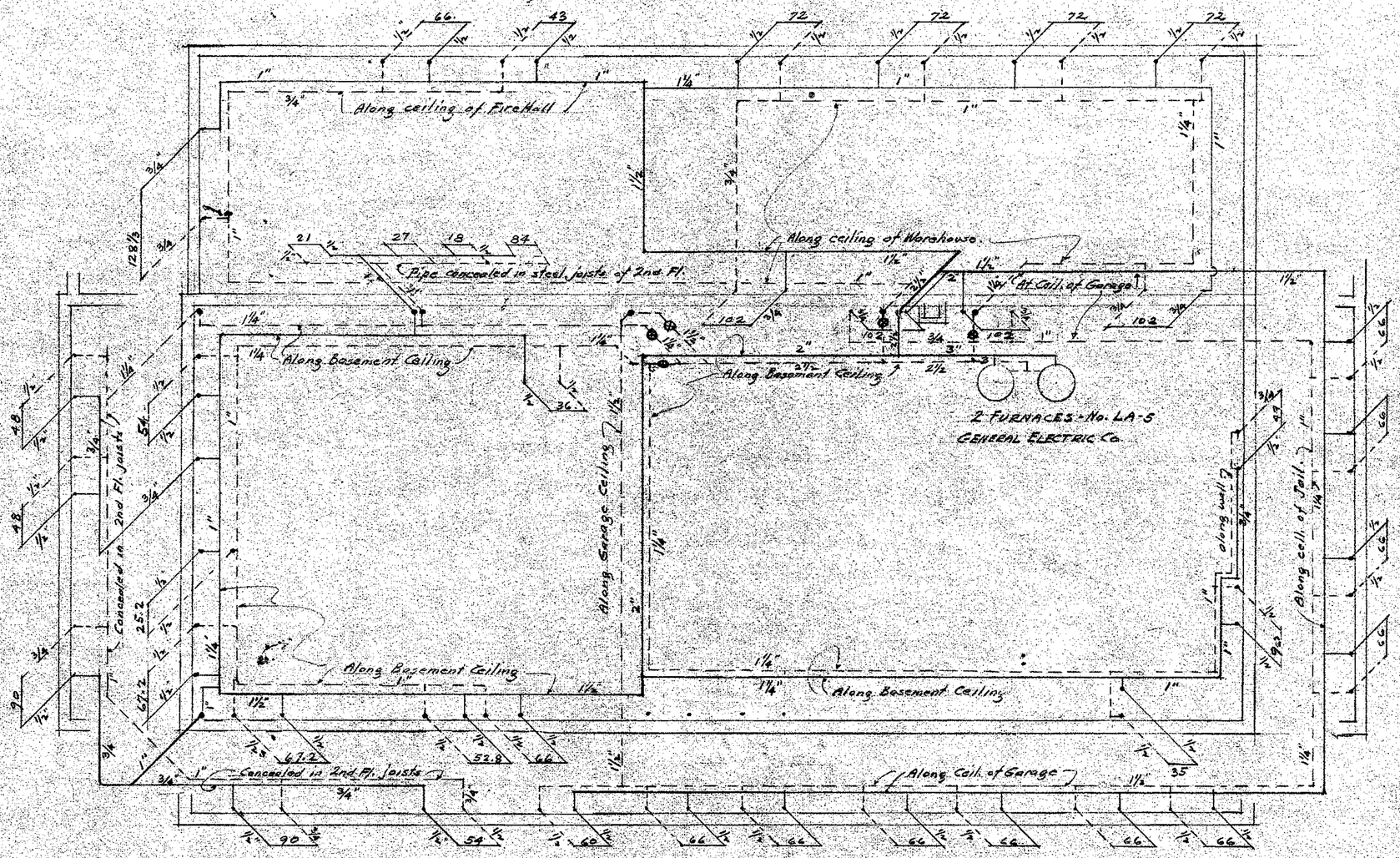
"STEEL COLUMN SCHEDULE"

No	SIZE
4	6"x6" H COL @ 18#
8	8"x8" H COL @ 31#
6	DO.
10	DO.
12	DO.

April 29, 1938

A CITY HALL FOR CITY OF GRAFTON
GRAFTON NO. DAK.

DRAWN NO. 8703	THEODORE B. WELLS ARCHITECT GRAND FORKS, N.D.	SHEET 8
TRACED 2805		



HOT WATER PIPING LAYOUT (Tentative)

SCALE 1/8" = 1'-0"

CITY HALL FOR THE CITY OF GRAFTON

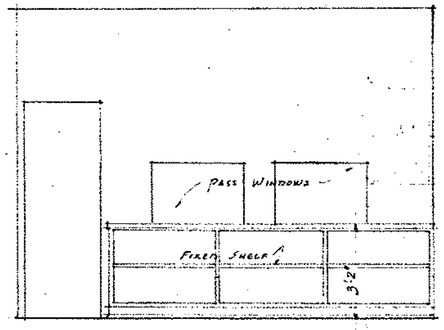
GRAFTON, NO. DAK.

PLAN NO. 3703
W.P.A. FILE 2305

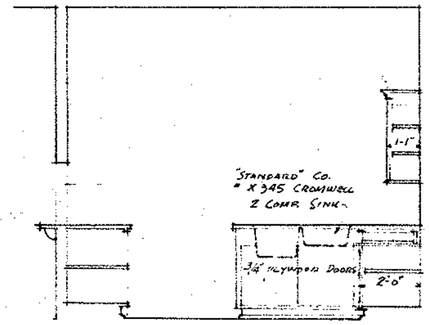
THEODORE B. WELLS
ARCHITECT
GRAND FORKS, N.D.

SHEET #11

MAY 15, 1936
April 23, 1936

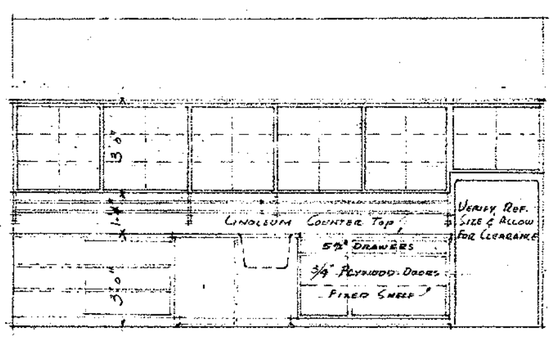


EAST WALL

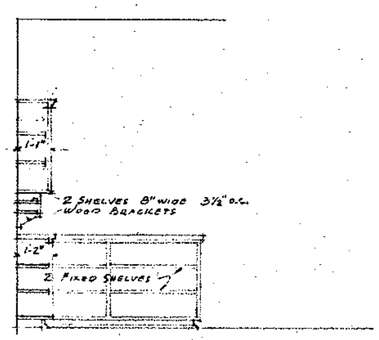


SOUTH WALL

Scale 1/4" = 1'-0"

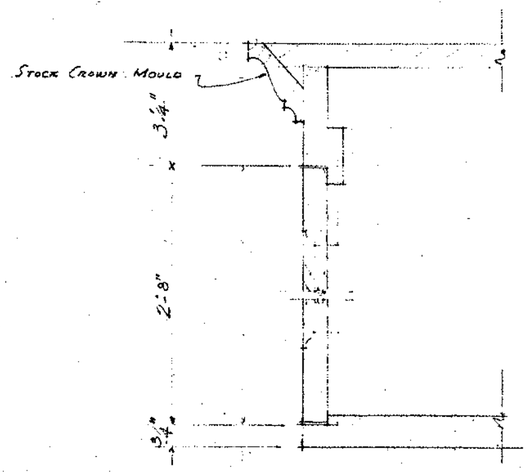


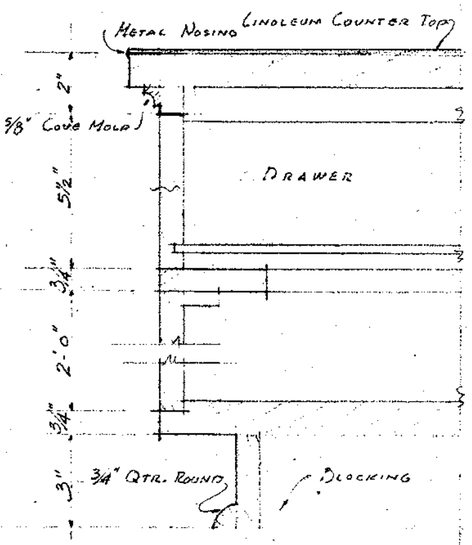
WEST WALL



PART NORTH ELEV

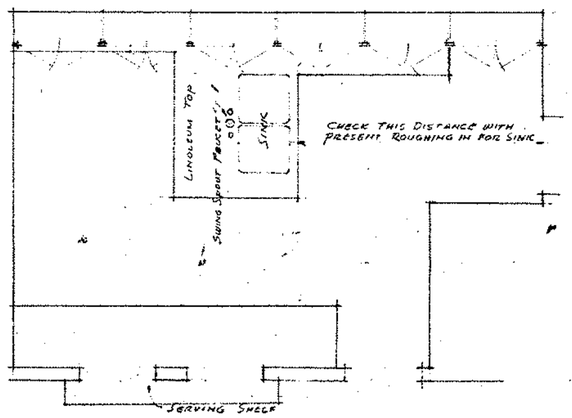
Scale 1/4" = 1'-0"



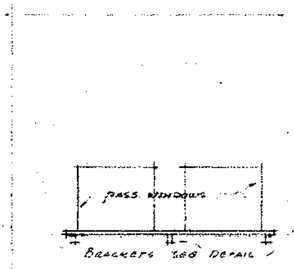


SECTION THRU CUPBOARD

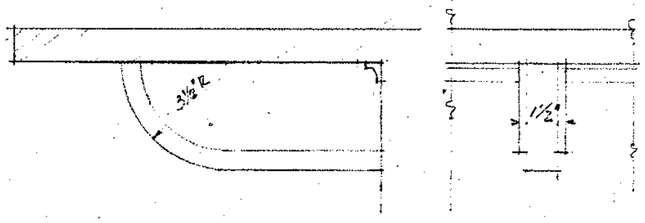
Scale 3" = 1'-0"



PLAN



ELEV. SHOWING SERVING SHELF



SECTION PART ELEV

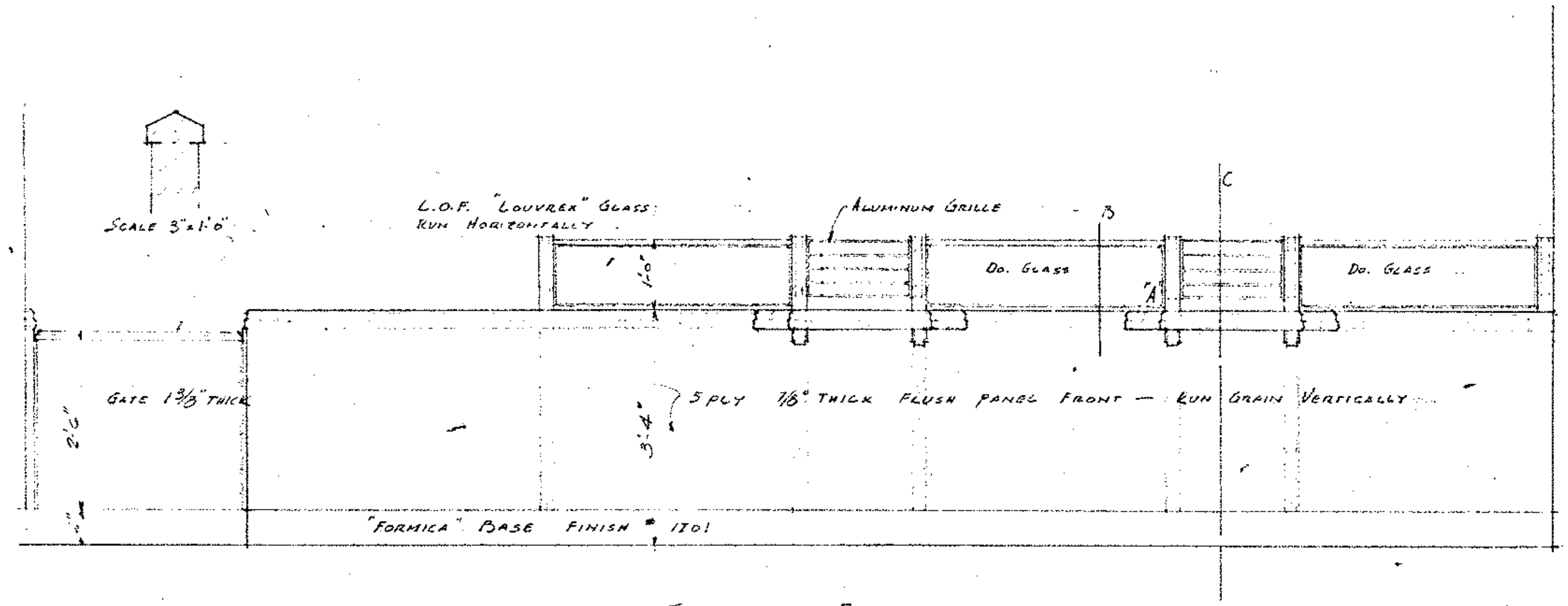
DETAILS OF SERVING SHELF

Scale 3" = 1'-0"

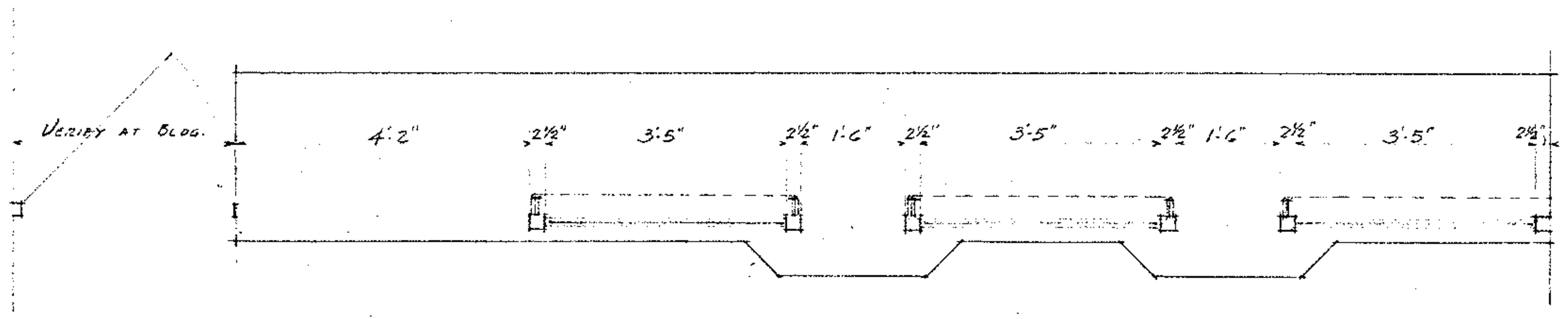
Scale 1/4" = 1'-0"

DETAILS OF CABINET WORK IN ROOM NO. 207

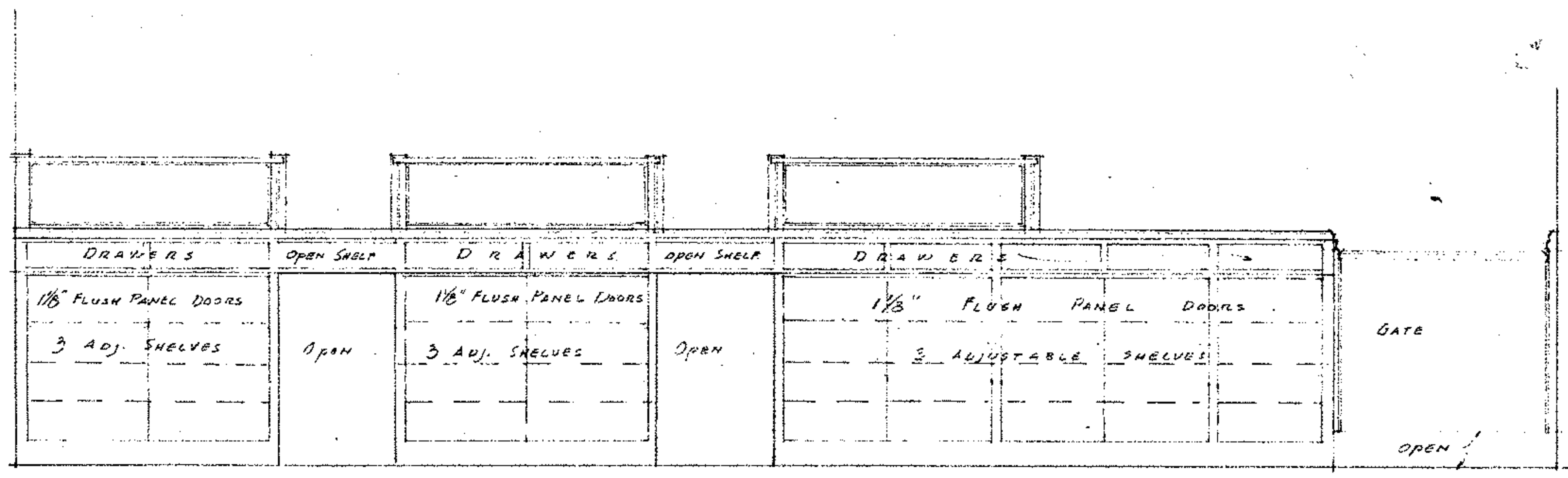
	A CITY HALL FOR CITY OF GRAFTON. GRAFTON, NO. DAK.	
PLAN NO. 3703 W.R.A. FILE 2305	THEODORE B. WELLS ARCHITECT GRAND FORKS, N.D.	SHEET



FRONT ELEVATION



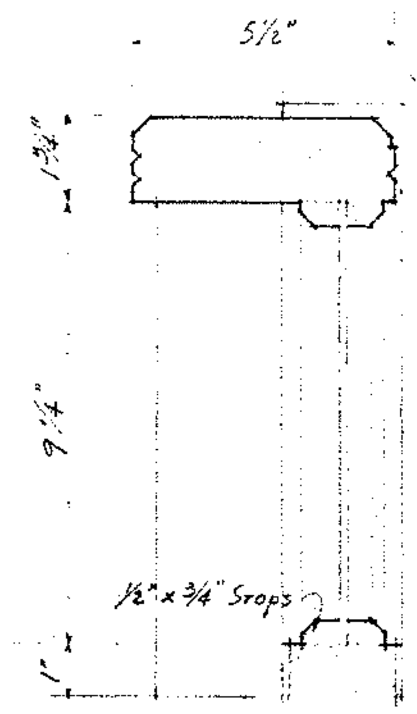
PLAN



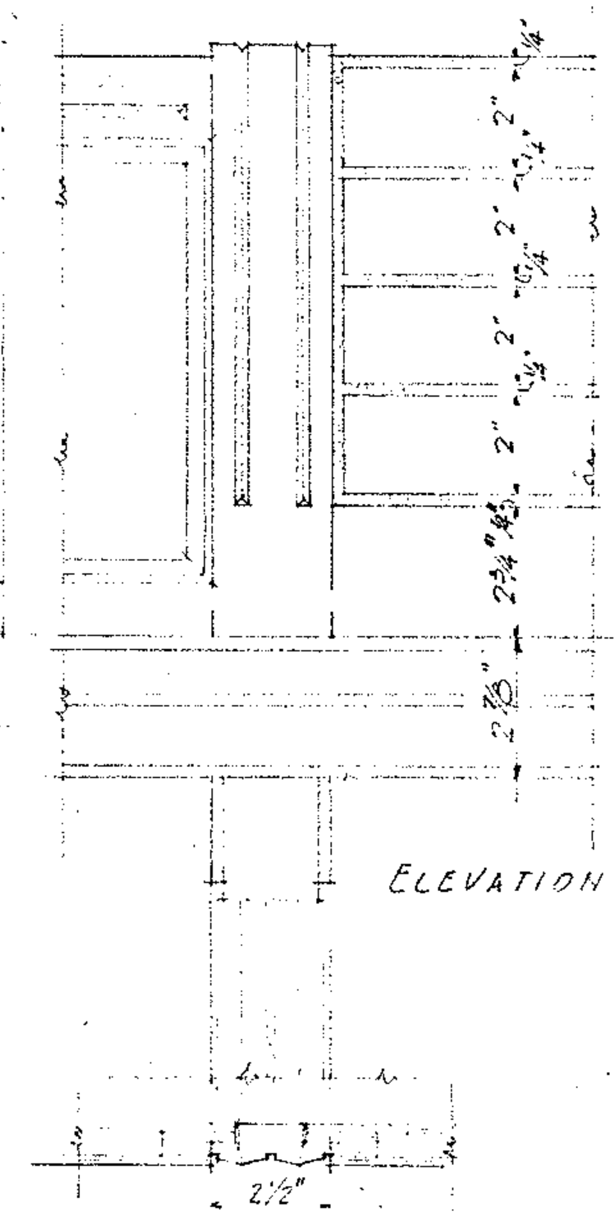
REAR ELEVATION

SCALE 1/2"=1'-0"

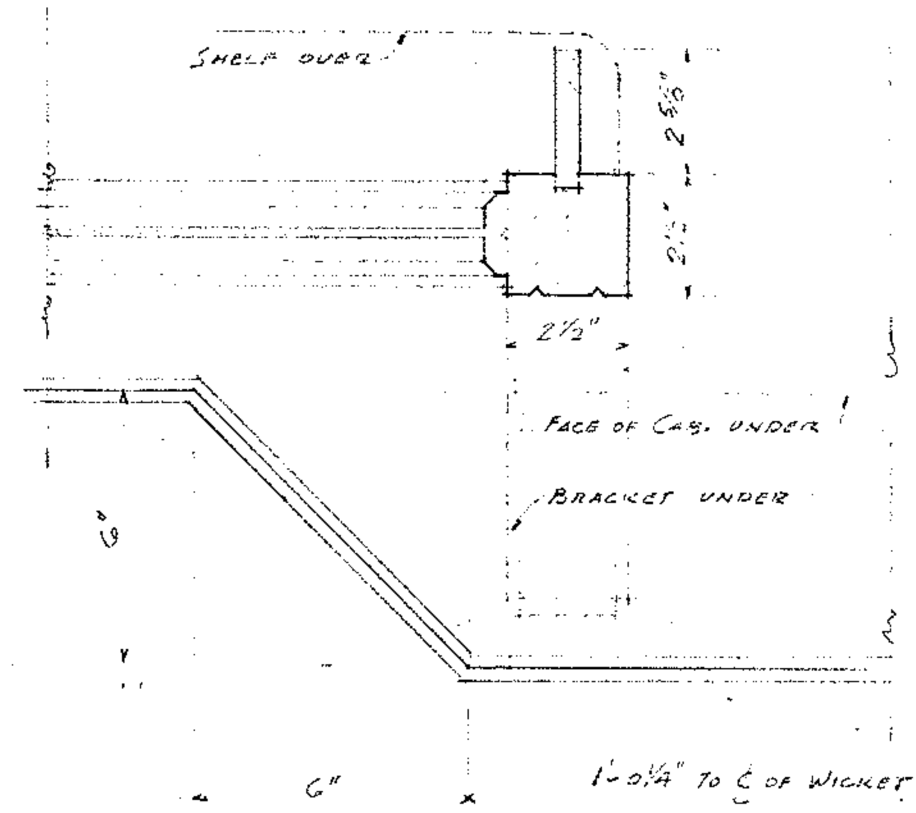
NOTE: DOORS & ALL OTHER LAMINATED MEMBERS MUST BE CAREFULLY STRIPPED ON ALL EXPOSED EDGES.
DOWEL OR HOUSE MEMBERS TOGETHER AND PROVIDE ALL NECESSARY BLOCKING TO INSURE A STOUGHT FINISHED PRODUCT.



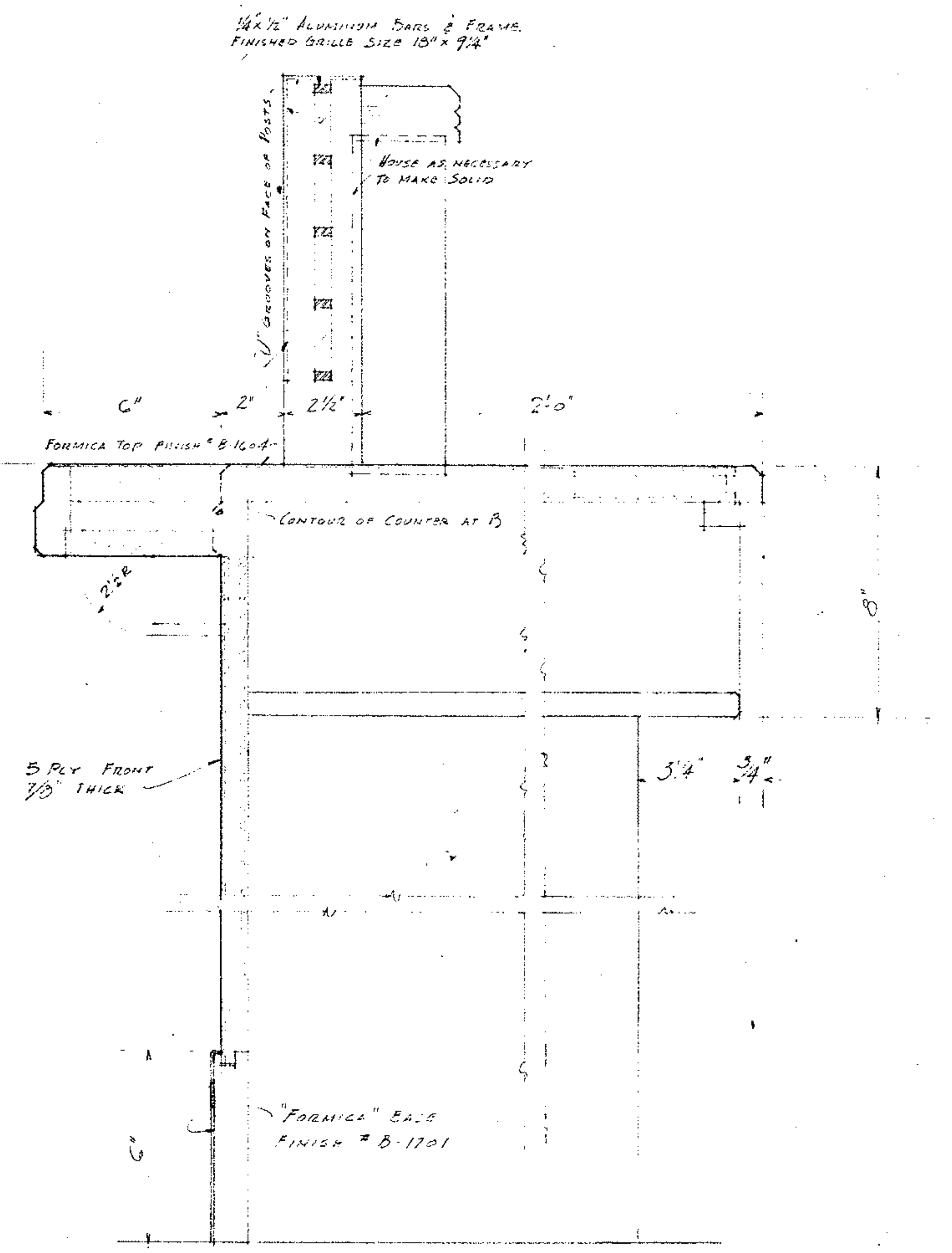
SECTION B



ELEVATION A



PLAN AT A



SECTION C

DETAILS OF CONSTRUCTION

SCALE 3"=1'-0"

A CITY HALL FOR
CITY OF GRAFTON
GRAFTON NO. DAK.

PLAN NO. 5703 | THEODORE B. WELLS ARCHITECT ... , N.D. | SHEET

WPA FILE

CAST STONE DRAWING No. 1

CITY HALL – GRAFTON, NORTH DAKOTA
THEODORE B. WELLS – ARCH'T. – GRAND FORKS, N.D.
AMERICAN ARTSTONE CO. – NEW ULM, MINN.
CAST STONE MANUFACTURERS.
ARTSTONE FINISH No. 89.
HONED SURFACE FINISH FOR BOTH ENTRANCE FEATURES & STEP BULKHEADS
BALANCE: STANDARD FINISH
FURNISH 100# OF ARTSTONE FACING AGGREGATE FOR POINTING JOINTS. CONTRACTOR TO MIX WITH WHITE CEMENT & LIME.

6-10-38 - 2 PRINTS - ARCH'TS APP.
6-15-38 - 4 " - PLANT

ONE (1) SET THUS - COPING
SOUTH ELEVATION

EAST ELEV. COPING

ONE (1) SET THUS - COPING
WEST ELEVATION

NORTH ELEV. COPING

ENTRANCE No. 2

SOUTH ELEVATION - BASE COURSE

GARAGE ENTRANCE

ENTRANCE No. 3

EAST ELEV. BASE COURSE

NORTH ELEV. BASE COURSE

ENTRANCE No. 1

WEST ELEVATION - TABLE COURSE

SECTION OF BASE COURSE 1½" SCALE

COPING SECTION 1½" SCALE

SKETCH OF CASTING ANCHOR. OTHER ANCHORS SIMILAR

ARCHT. PLEASE FIX LOCATION & SIZE OF HOLE FOR CONDUIT OPENING

¼" STEEL PLATE

¼" X 1½" X 8" STRAP ANCHORS 2 EACH SIDE OF EVERY JOINT

¼" X 7½" PLATE

BASE COURSE

#4 THIS SIDE
#5 OPP. "

CEMENT STEPS

ELEVATION OF ENTRANCE No. 1
¾" SCALE

SECTION ON ℄

STOP SADDLE & BACK WASH

BEVEL SIDES

SECTION "C"

PLAN

PLAN AT A-A B-B OPPOSITE

SIDE ELEVATION OF STEP BUTTRESS
ONE SIDE THUS – ONE SIDE OPPOSITE
ENTRANCE No. 1

INSCRIPTION TO DETAIL

⅝" STEEL PLATE

ELEVATION OF ENTRANCE No. 2
¾" SCALE

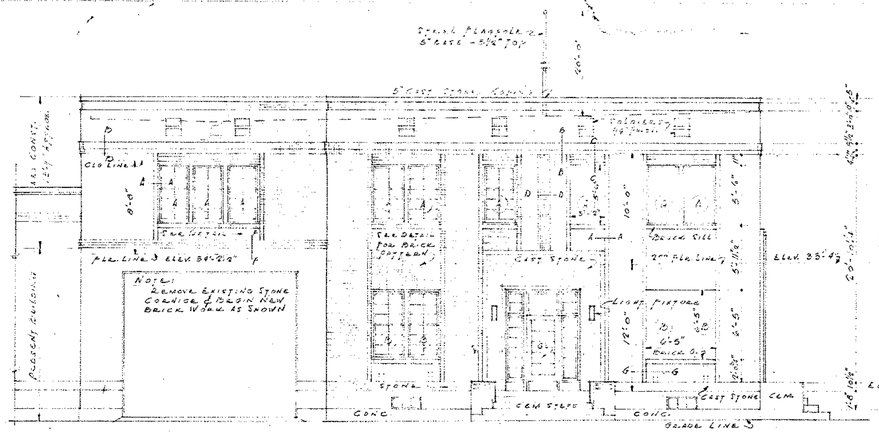
PLAN AT D-D E-E OPPOSITE

#30 THIS SIDE
#31 OPP. SIDE

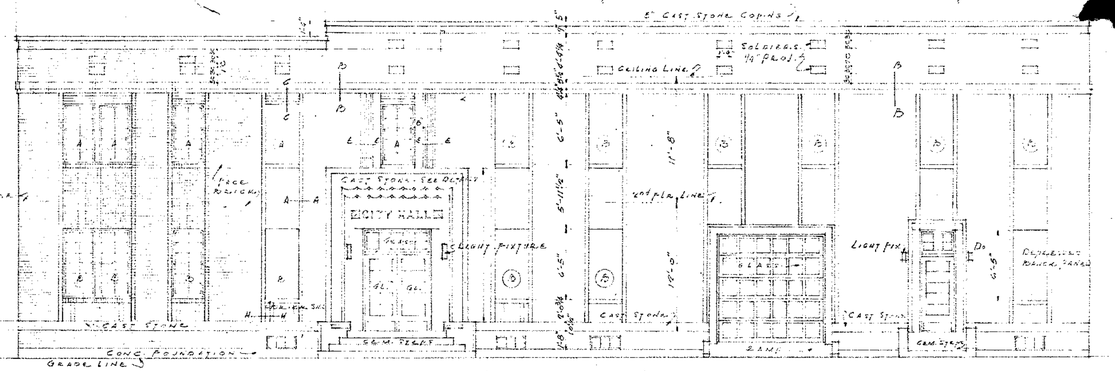
#27 THIS SIDE
#28 OPPOSITE SIDE

SIDE ELEVATION OF STEP BUTTRESS
ONE SIDE THUS – ONE SIDE OPPOSITE
ENTRANCE No. 2

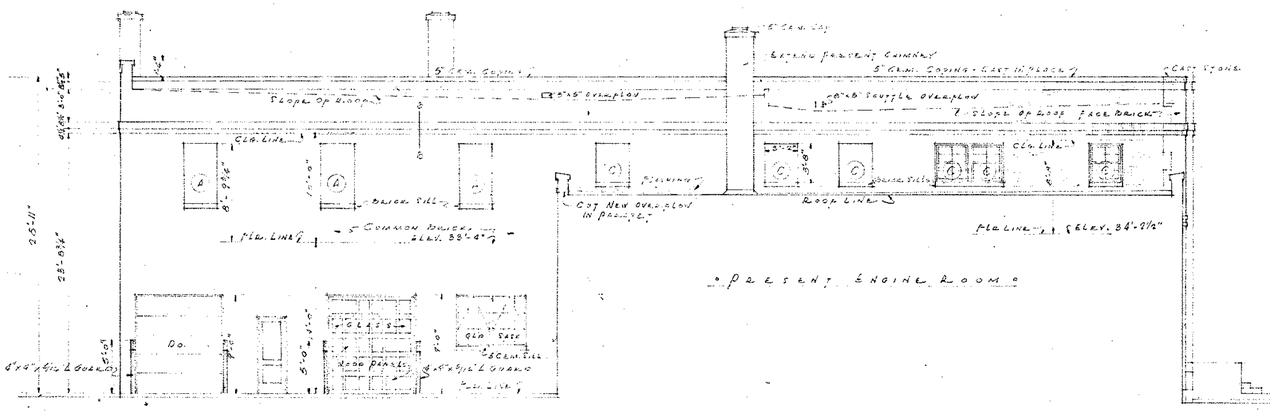
Note: Top of Bulkhead Must Not Go Above Level of Top of Stone Base Course
Elev. 21'-6"
Cast Stone
Cem. Steps
Sidewalk Line
This Setback Stops Here
8" Foundation Wall
Elevation
Elev. 21'-4"
Rounded Surface
Cast Stone
Cem. Steps
Sidewalk Line
8" Foundation Wall
Elevation
Cast Stone
Cem. Platform
Reinforce as a Beam
Long. Section on Line "C-C"
Cem. Platform
Reinforce as a Beam
Long. Section on Line "D-D"
Wall Line
Foundation Wall
Landing
Not Excavated
1'-0" x 8" Footing
13'-6½"
Part Top View Plan
Part Foundation Plan
Foundation Wall
Landing
Not Excavated
12" x 8" Footing
14'-8"
Part Top View Plan
Part Foundation Plan
Profile of Slab on Bulkhead
Detail on Line "A-A"
3" = 1'-0"
Detail on Line
Detail on Line "E-E"
1" = 1'-0"
These Details Supersede Previous Drawings June 15,
5" Conc. Slab
Conc. Beam to Carry Cast Stone on Bulkhead
Present Wall
Foundation Wall
Section on ℄
Cast Stone
Sidewalk Line
Face of Wall
Foundation Wall
End Elev.
Details for Exterior Steps #1
Curved Surface
Level
Conc. Beam to Carry Cast Stone on Bulkhead
Present Wall
Foundation Wall
Section on ℄
Cast Stones
Note - That Setback Stops Here
Sidewalk Line
Face of Wall
Foundation Wall
End Elev.
Details for Exterior Steps #2
Scale Except as Noted - ½" = 1'-0"
A City Hall
City of Gr
Grafton, No.
Theodore B. W
A. Schize
Grand Forks, N



◦WEST ELEVATION◦
SCALE: 1/8"=1'-0"

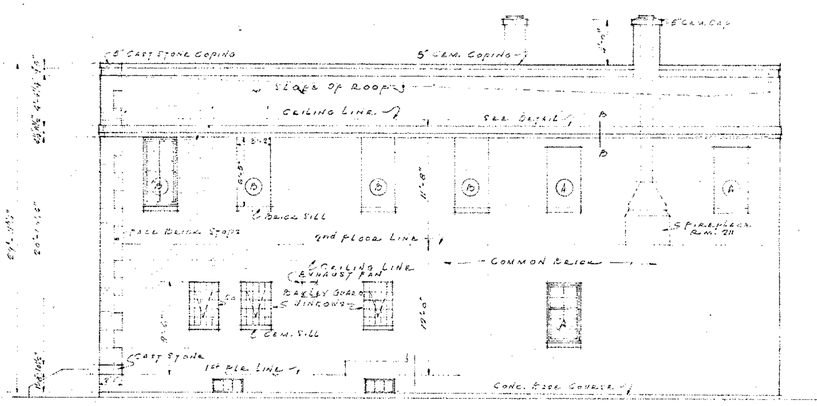


◦SOUTH ELEVATION◦
SCALE: 1/8"=1'-0"

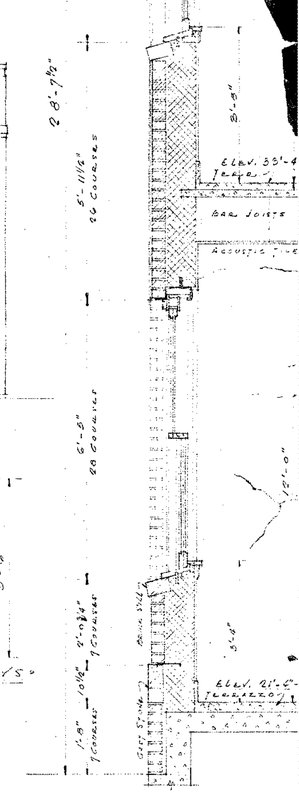


◦PRESENT ENGINE ROOM◦

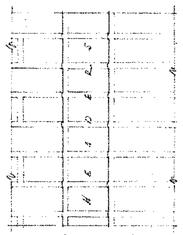
◦NORTH ELEVATION◦
1/8"=1'-0"



◦EAST ELEVATION◦
SCALE: 1/8"=1'-0"

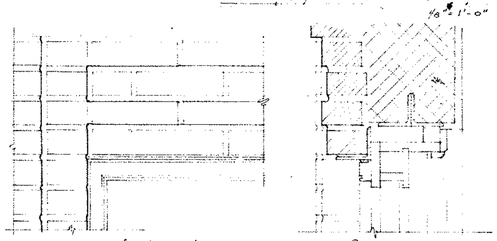


◦TYPICAL WALL SECTION◦
SCALE: 1"=1'-0"

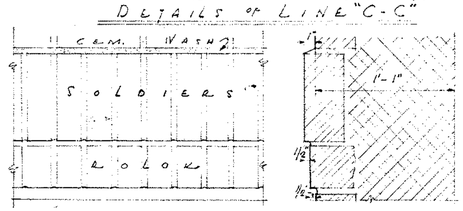


PLAN

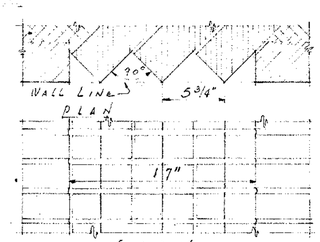
◦DETAILS OF LINE "A-A"◦



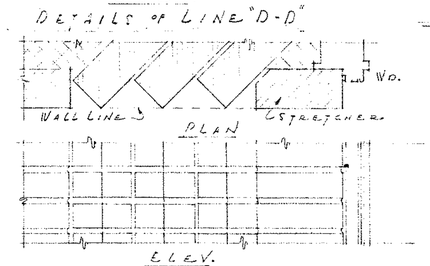
DETAILS of LINE "C-C"



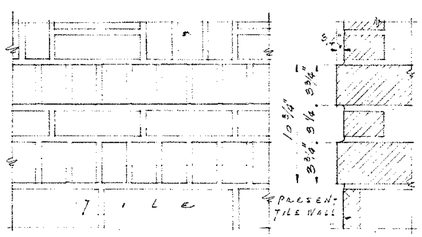
DETAILS of LINE "B-B"



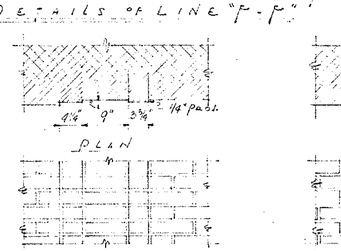
DETAILS of LINE "D-D"



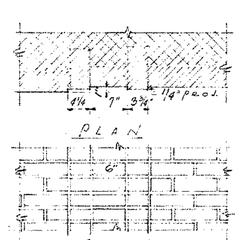
DETAILS of LINE "E-E"



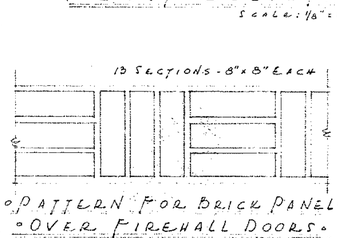
DETAILS of LINE "F-F"



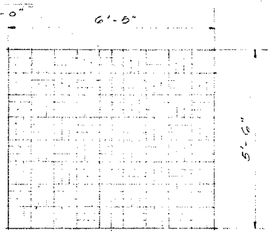
DETAILS of LINE "G-G"



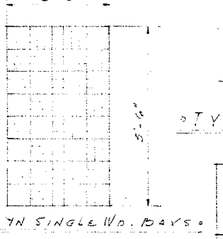
DETAILS of LINE "H-H"



◦PATTERN FOR BRICK PANEL◦
◦OVER FIREHALL DOORS◦
1½"=1'-0"



◦PANEL IN MULLION WD BAYS◦

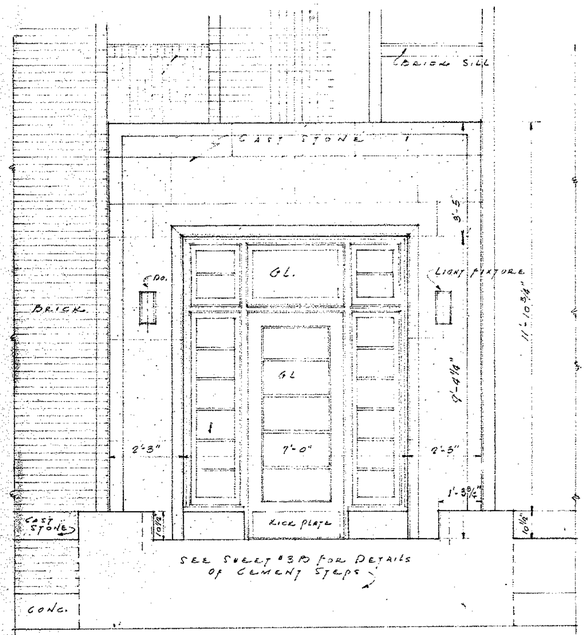


◦PANEL IN SINGLE WD. BAYS◦

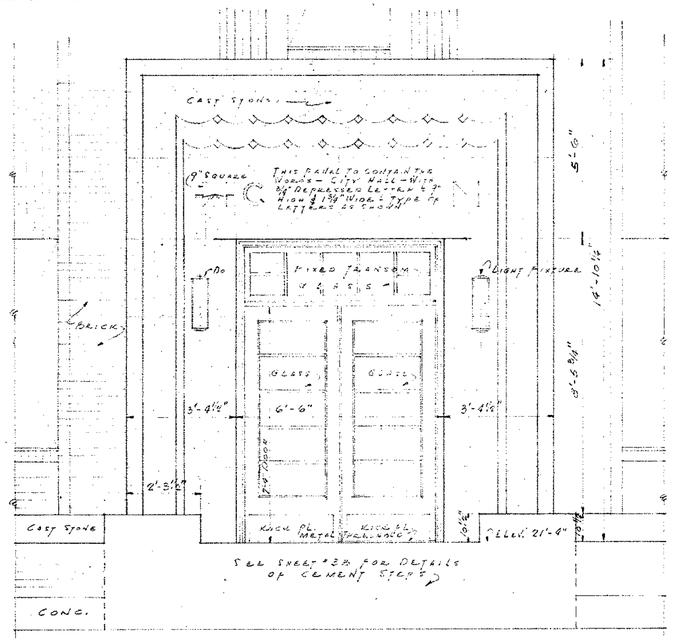
◦BRICK PATTERN FOR◦
◦WINDOW SPANDRELS◦

A CITY HALL FOR
◦CITY OF GRAFTON
GRAFTON, N. DAK.

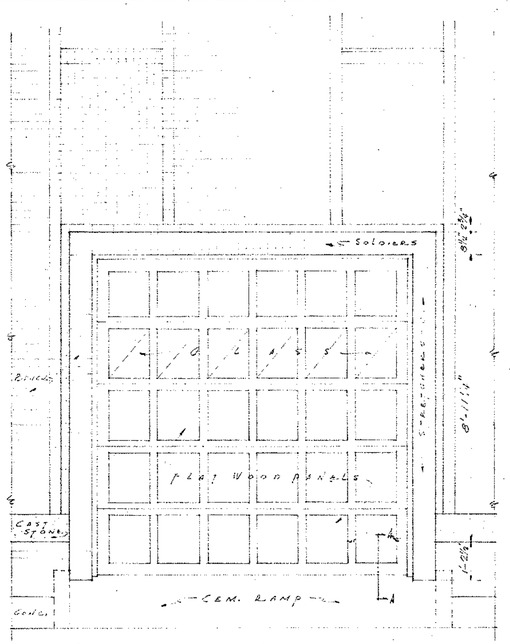
PLAN No 3702 W.P.A. PROJ. 2508	THEODORE B. WELLS ARCHITECT GRAND FORKS, N. DAK.	SHEET



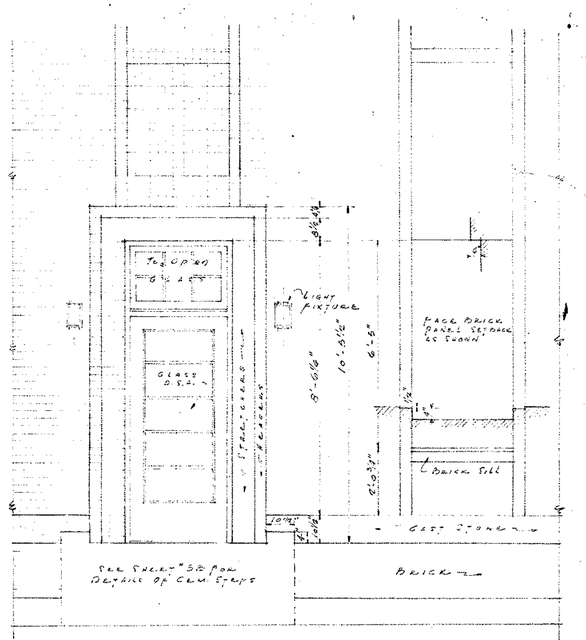
◦ELEV. of ENTRANCE #1◦
3/8" = 1'-0"



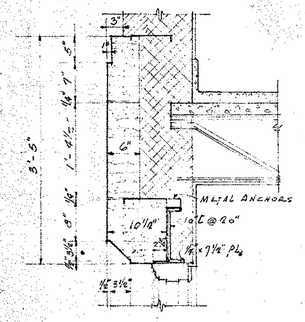
◦ELEVATION of ENTRANCE #2◦
3/8" = 1'-0"



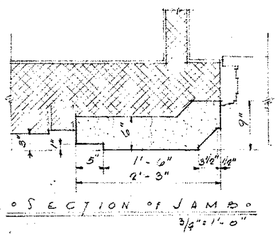
◦ELEVATION of DOOR to GARAGE◦
3/8" = 1'-0"



◦ELEVATION of ENTRANCE #3◦
3/8" = 1'-0"

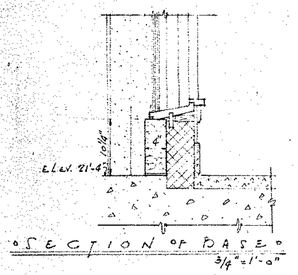


◦SECTION of HEAD◦
3/4" = 1'-0"

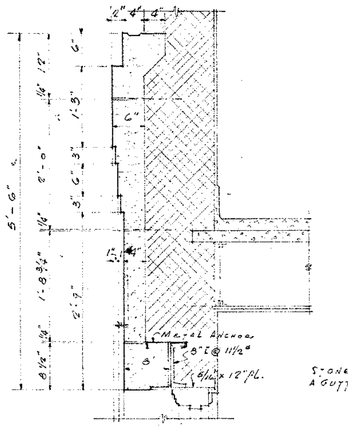


◦SECTION of JAMB◦
3/4" = 1'-0"

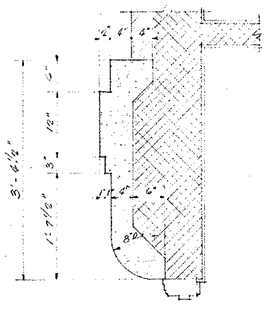
◦STONE DETAILS FOR◦
◦ENTRANCE #1◦



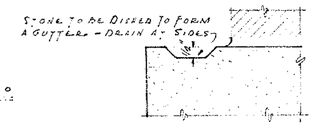
◦SECTION of BASE◦
3/4" = 1'-0"



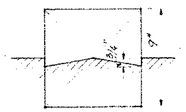
◦SECTION THRU HEAD◦
3/4" = 1'-0"



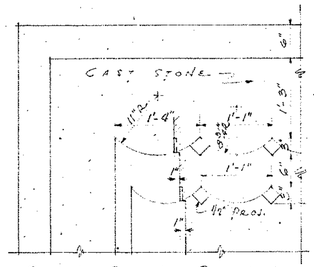
◦SECTION THRU JAMB◦
3/4" = 1'-0"



◦DETAIL of CAP◦

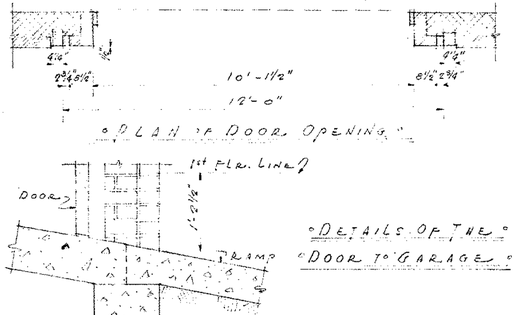


◦DEPRESSED PANEL◦
1½" = 1'-0"



◦CAST STONE DETAIL◦
3/4" = 1'-0"

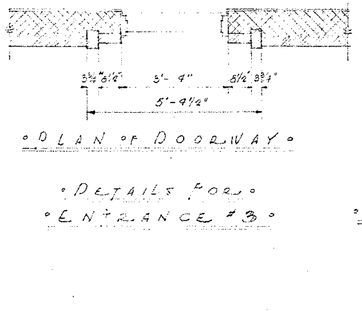
◦STONE DETAIL FOR◦
◦ENTRANCE #2◦



◦PLAN of DOOR OPENING◦

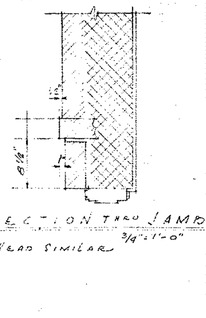
◦DETAILS OF THE◦
◦DOOR to GARAGE◦

◦DETAIL "A-A"◦
3/4" = 1'-0"

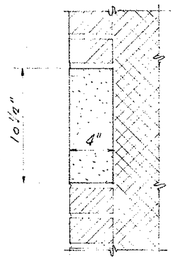


◦PLAN of DOORWAY◦

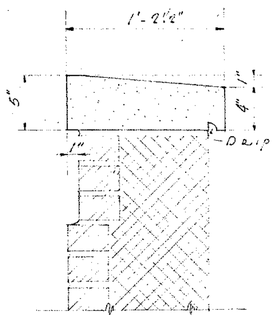
◦DETAILS FOR◦
◦ENTRANCE #3◦



◦SECTION THRU JAMB◦
HEAD SIMILAR
3/4" = 1'-0"



◦CAST STONE◦ ◦BASE COURSE◦
1½" = 1'-0"

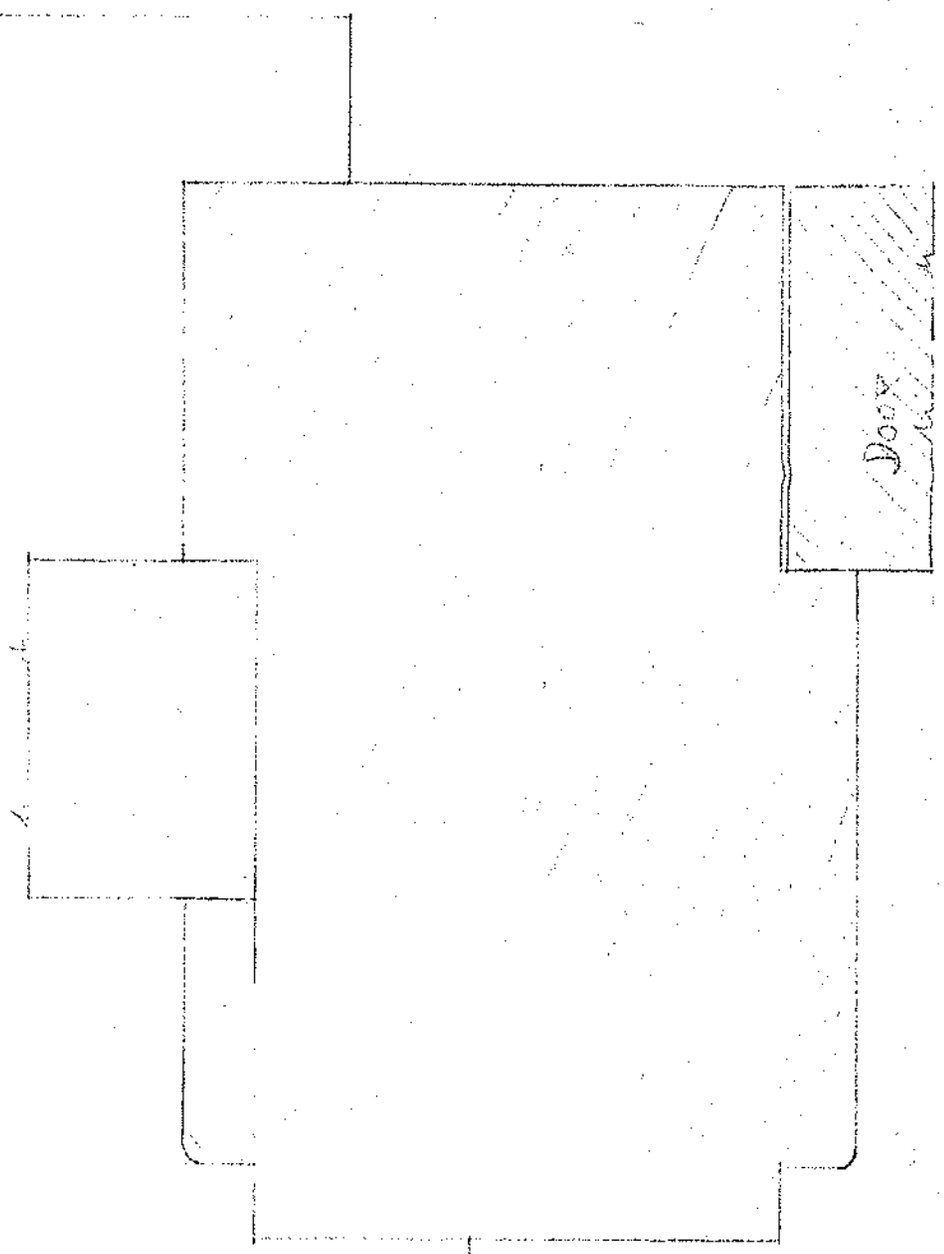


◦CAST STONE◦
COPING◦
1½" = 1'-0"

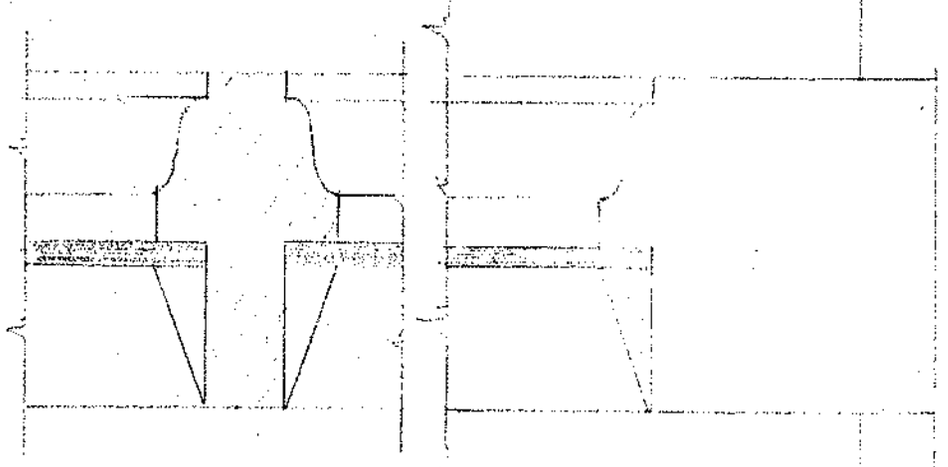
A[illegible]Y WALL FOR
CITY of GRAFTON
GRAFTON, NO. DAK.

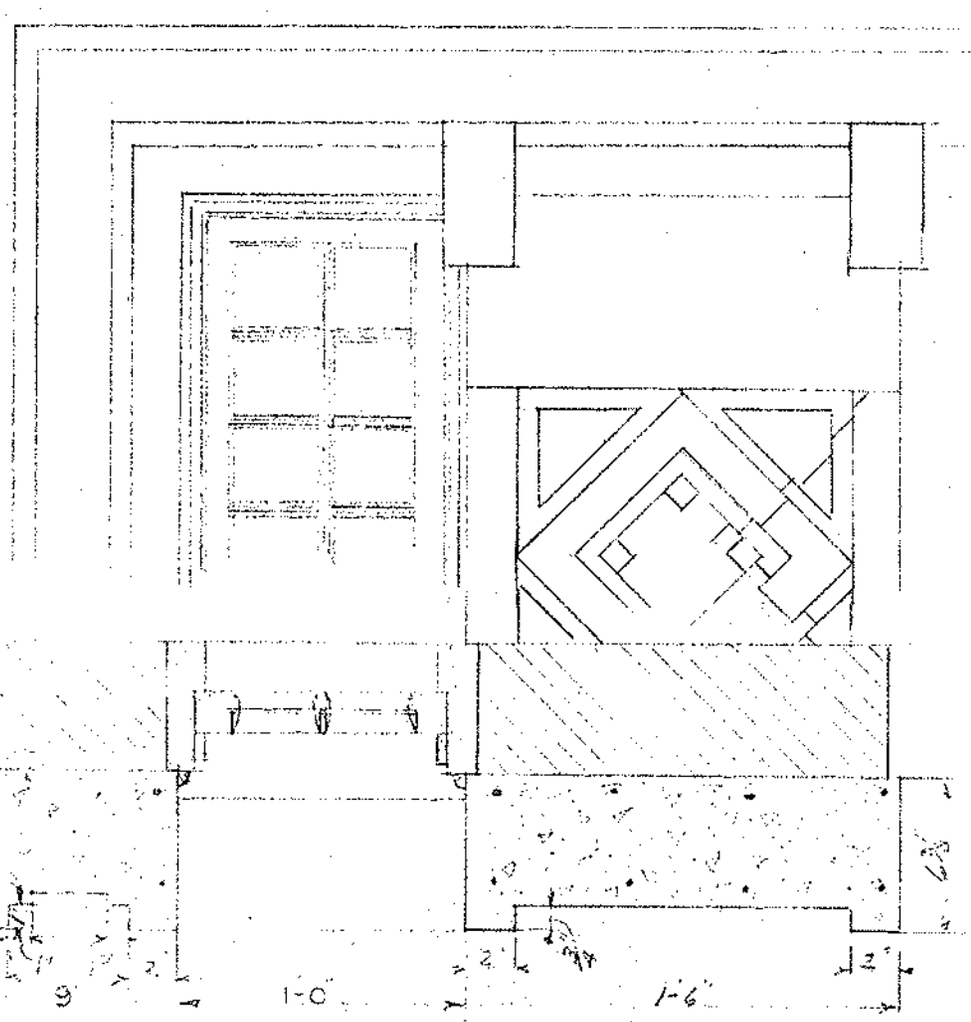
PLAN No. 3708 W.C.A. FILE 2305	THEODORE B. WELLS ARCHITECT GRAND FORKS, N.D.	SHEET # 7

HEAD
JAMB
MULLION
CHECK RAIL
SILL
TYPICAL DETAILS FOR DOUBLE-HUNG WINDOWS
HEAD
JAMB
HEAD & JAMB DE... FOR D.H. WDS IN R...
F.S. MUNTIN
DOOR FRAME IN 12" WALL
DOOR FRAME IN 8" WALL
DOOR FRAMES IN RM. #112
HEAD
TRANSOM BAR
MULLION
SILL
PROVIDE 3/4" RABBET ON LOCK SIDE OF DR. FRAME
HEAD
TRANSOM BAR
JAMB
HEAD
JAMB SIMILAR
TRANSOM BAR
DETAILS FOR ENTRANCE #3
DIAGRAM OF SINGL... WEIGH FOR MULLION
TO SASH
PULLEY
SASH WEIGHT
F.S. HANDRAIL
1/2 F.S. BASE IN RM. #208
SECT.
CAP FOR STAIR R...
METAL COR. BEAD
HEAD
TRANSOM BAR
JAMB
OMIT
DOOR
FRAMES IN 4" WALL
TRANSOMS ONLY WHERE SHOWN
INTERIOR DOOR FRAME DETAILS
DETAILS FOR ENTRANCE #1
DETAIL FOR ENTRANCE #2
EXTERIOR DOOR FRAME DETAILS
NOTE: ALL DETAILS AT SCALE 3"=1'-0"
A CITY HALL
CITY OF GR...



F.S. of Door Post, Sash & Frame





Cast Stone Details at Front.

Scale 1½" = 1'-0"

Municipal Water Plant & Fire D.

for

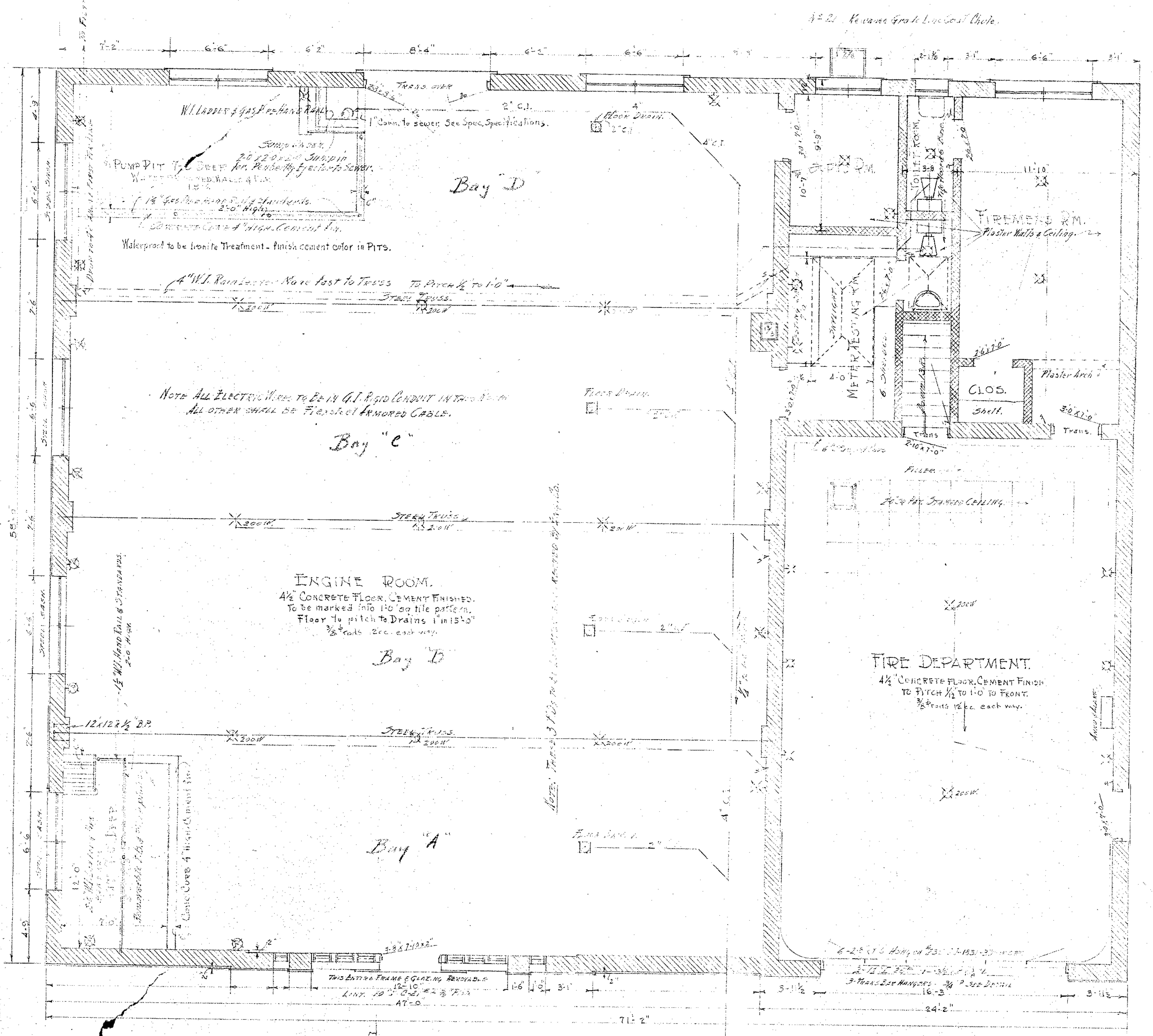
The City of Grafton, N.D.

Designed by

Municipal Engineers

St. Paul, Minn.

Walter J. MacLeith, C.E.

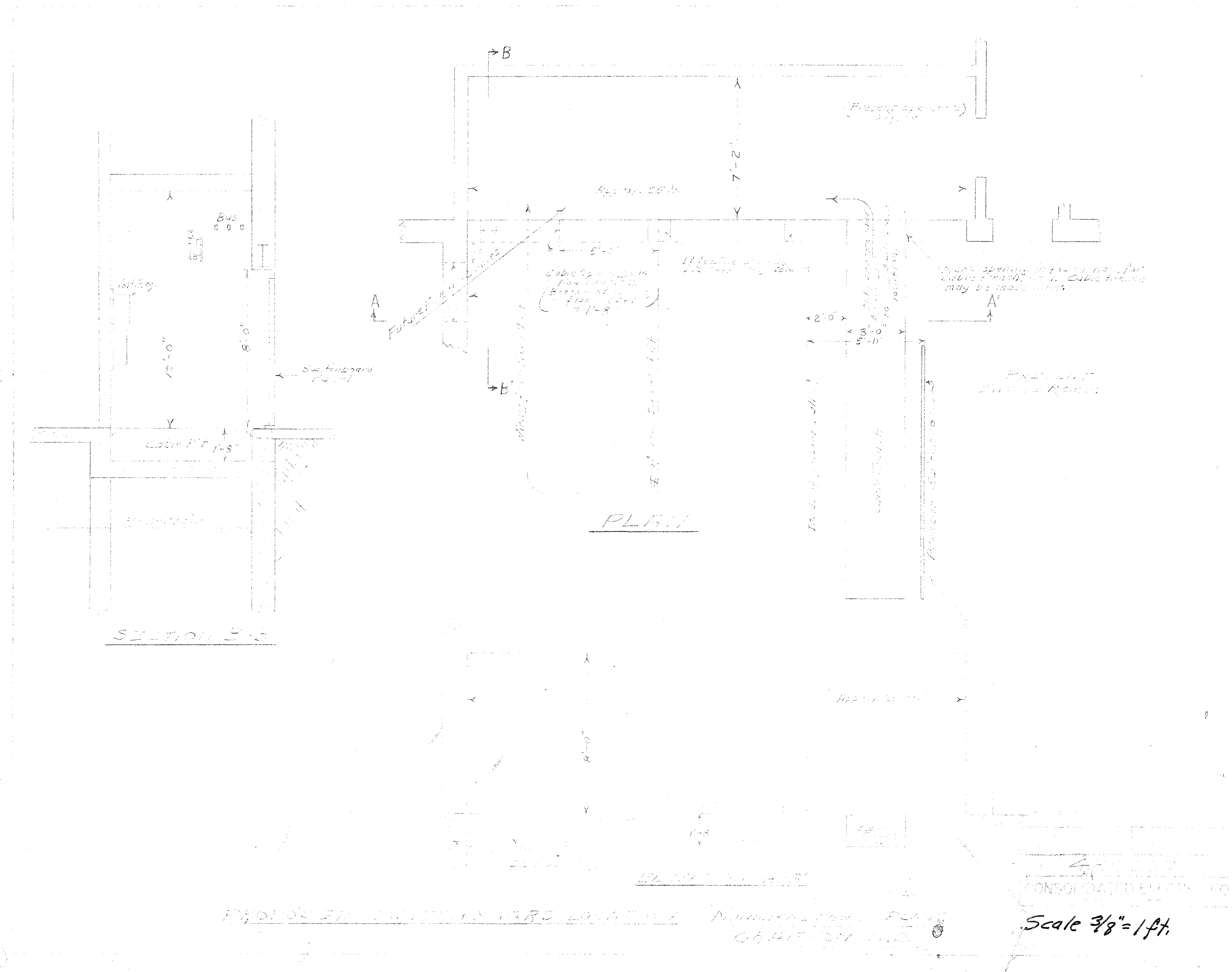


First Floor Plan.

Scale ¼" = 1'-0"

Note:
Building Contractor to construct water supply lines from fixtures in toilet-room & to discharge of pump in pump-pit. Also supply (¾") line to heating boiler and meter-testing bench.

Note:
All floor drains to be as specified under "Plumbing" for drains in boiler room.
All drains and drainage pipes in building to be furnished and installed by building contractor, and connected by him to 6" sewer not over 6'0" outside of building. 6" sewer will be laid under Division V.


B
B'
A
A'
7'-2"
Bus
Cable Pit
1'-8"
8'-0"
2'-0"
3'-0"
5'-11"
PLAN
Scale 3/8" = 1 ft.

Fire Station Facility

Grafton Fire Department Grafton N Dak

Board of Directors

Leroy Erickson	President
Thomas LaHaise	Vice President
Leroy Nelson	Secretary Treasurer
Dennis Lykker	Director
Clayton LaMont	Director

Miles Haug Building Committee President

Drawing Sheet Index

Construction Notes

1. The CONTRACTOR shall employ a Registered Land Surveyor to establish Property corners,Building location and first floor elevations in reference to the established bench marks and site design

2. The CONTRACTOR shall verify prior to submitting the proposal,with the appropriate municipal authority,locations of city sewer line(existing and proposed),water lines and stub-ins, and shall determine depths of sewer lines for verification of slope to drainfor the project. Municipal requirements relating to connections to city utilities shall be determined and any costs to be incurred shall be reflected in the proposal.

3. The CONTRACTOR shall verify prior to submitting the proposal with the appropriate utility authority,including the Telephone Company,locations of electric service lines,transformers,telephone lines,gas service lines,and meter locations and secure the necessary approvals and reflect in the proposal any costs to be incurred relating to utility company requrements for connection

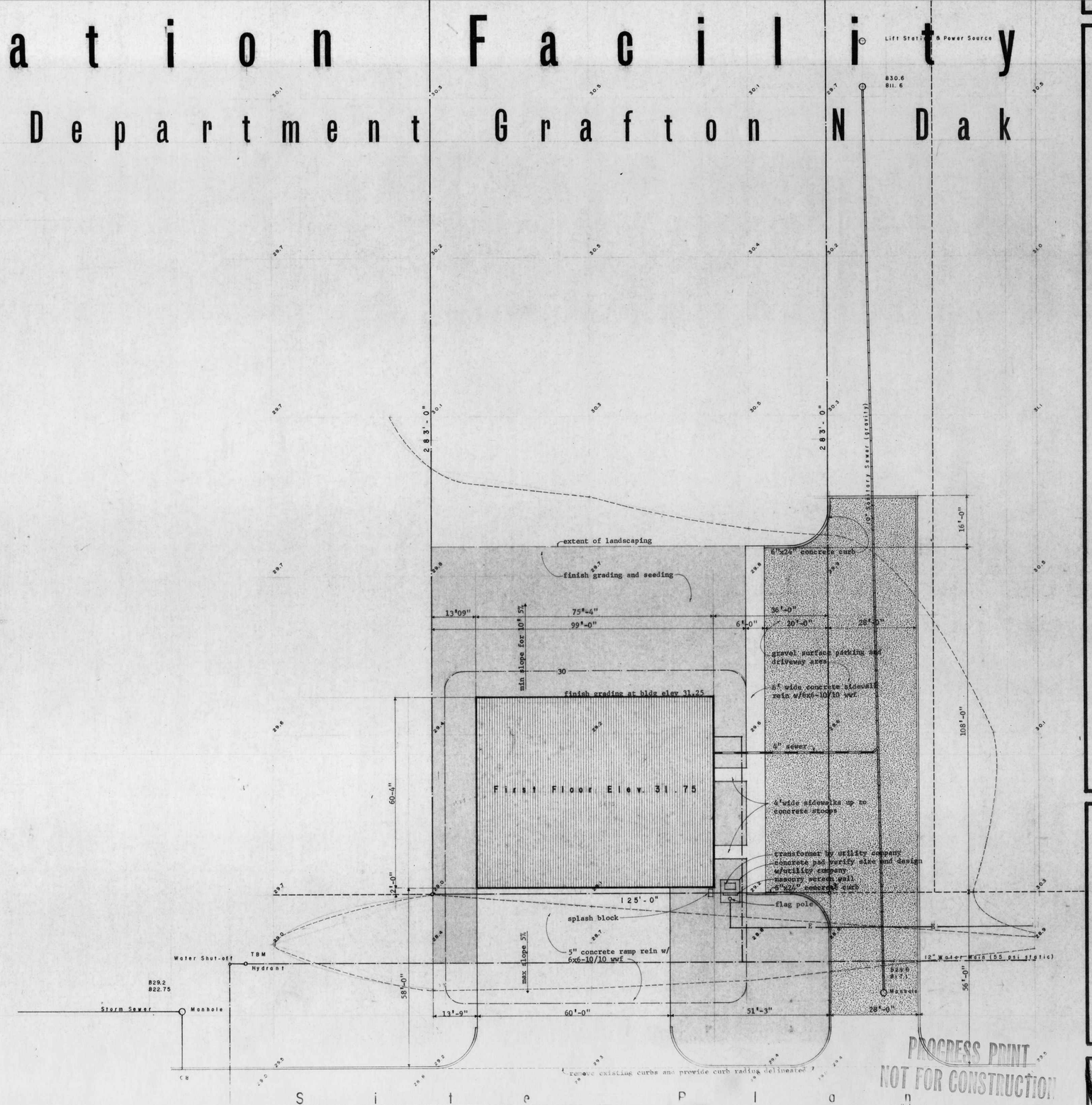
4. The CONTRACTOR shall employ a soil testing company for any necessary observations and reccommendations relative to exposed slab and footing bearing strata after excavation work has been completed. Fill for slab bearing shall be approved and compacted to a density of 95% of the maximum dry density and be substantiated by test reports

5. The CONTRACTOR shall reveiw and compliment with appropriate allowances if necessary all Sub Contractor and Supplier quotations to insure that proposal are all inclusive to provide the necessary components and servicesrequired by the Contract

6. The CONTRACTOR shall bring to the ARCHITECTS attention any discrepancies in the construction documents or code violations called for in the documents prior to submitting the proposal.

7. The CONTRACTOR shall provide finish grading to accomodate slope to drain and for pedestrian and vehicular access as follows

Paved Areas	1.5% Min	Sidewalks	5.0% Max
Seeded Areas	2.0% Min	Slope away from bldg	5.0% Max



Site Plan

PROGRESS PRINT
NOT FOR CONSTRUCTION

DOOR SCHEDULE

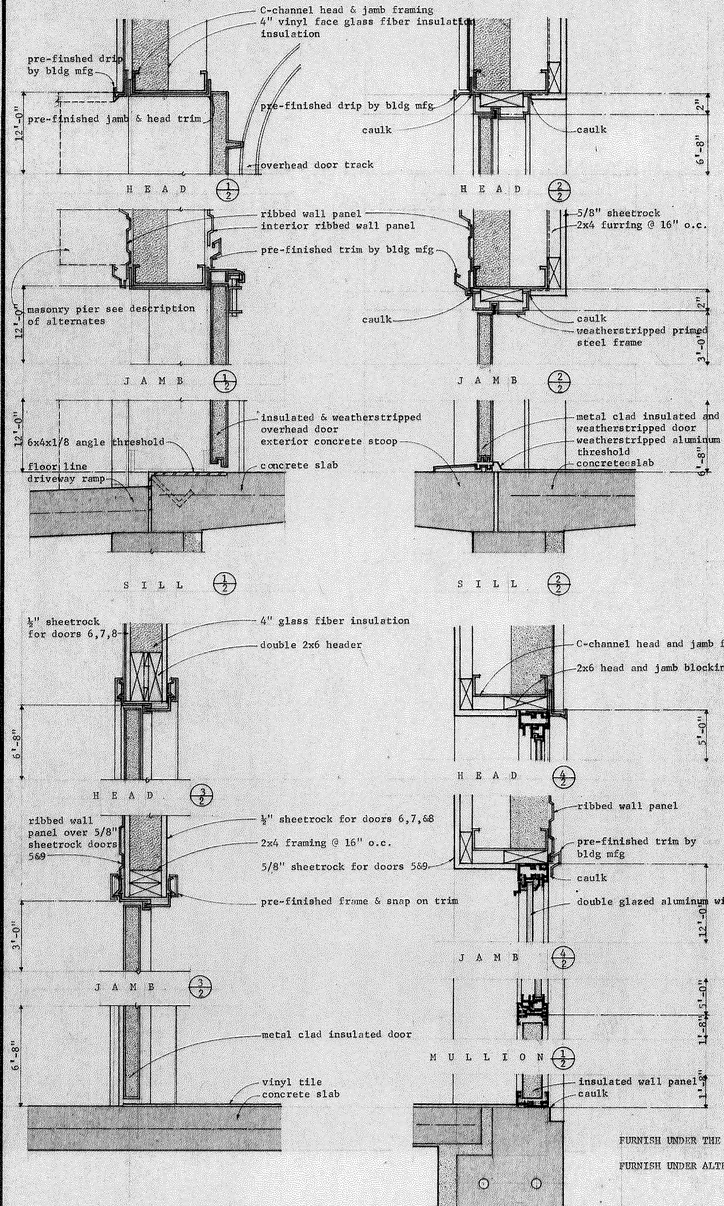
NO	DOOR SIZE	AMT	DOOR MATERIAL	DOOR FINISH	FRAME MATERIAL	FRAME FINISH	HDW	HEAD	JAMB	SILL	REMARKS
1	12'-0"x 12'-0"x 2"	4	Galvalume Clad	Pre-Finished	26 Gauge	Patrican Bronze	1	1	1	1	Steel/polyurethane sandwich Panel
2	3-0" x 6'-8" x 1 3/4"	1	Steel Clad Insul	OW-61 *	18 Gauge	" "	2	2	2	2	Paint frame to match Patrican Brn
3	3-0" x 6'-8" x 1 3/4"	1	" "	"	"	" "		2	2	2	" " " "
4	3-0" x 6'-8" x 1 3/4"	1	" "	"	"	" "		sim to 2	sim to 2	sim to 2	" " " "
5	3-0" x 6'-8" x 1 3/4"	1	" "	"	"	Pre-Finished		sim to 3	sim to 3	sim to 3	See Description of Alternates
6	3-0" x 6'-8" x 1 3/4"	1	" "	"	"	"		3	3	3	" "
7	3-0" x 6'-8" x 1 3/4"	1	" "	"	"	"		3	3	3	" "
8	3-0" x 6'-8" x 1 3/4"	1	" "	"	"	"		3	3	3	" "
9	3-0" x 6'-8" x 1 3/4"	1	" "	"	"	"		3	3	3	" "

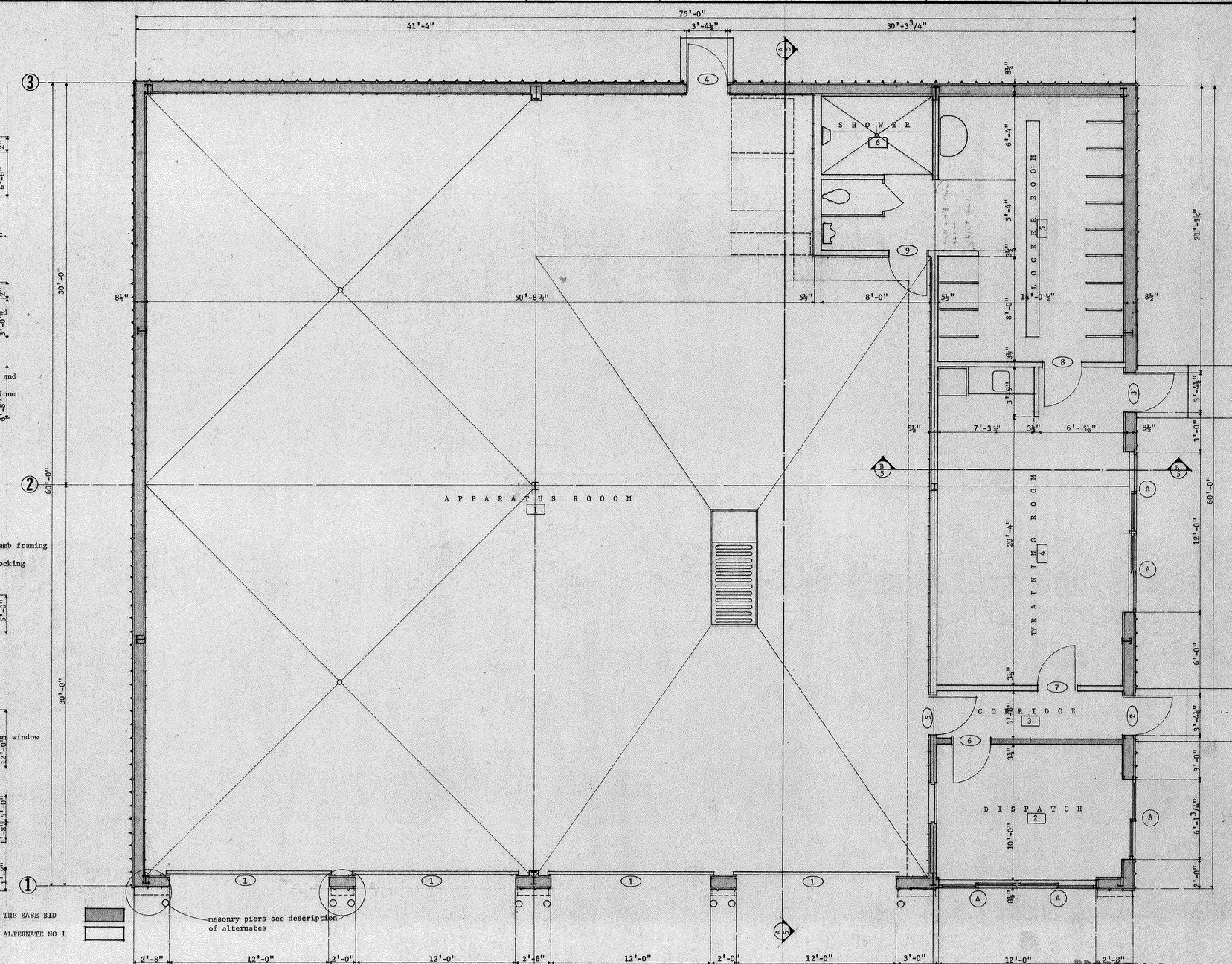
ROOM SCHEDULE

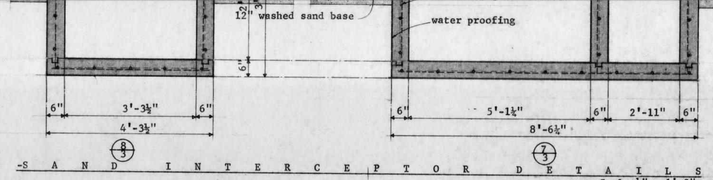
NO	ROOM	FLOOR MATERIAL	FLOOR FINISH	WALL MATERIAL	WALL FINISH	BASE MATERIAL	BASE FINISH	CEILING MATERIAL	CEILING FINISH	HT	REMARKS
1	Apparatus Room	Concrete	Steel Troweled	26 ga liner	Pre-Finished	None		Exposed Insul	White Vinyl	varies	
2	Dispatch	Vinyl Tile	52100 Putty	Sheet Rock	Sand	Vinyl	Russet KC-2	2x4 Lay-in Tile	Fissured	8'-0"	See Description Alt
3	Corridor	" "	" "	" "	"	"	" "	"	"	"	" " " "
4	Training Room	" "	" "	" "	"	"	" "	"	"	"	" " " "
5	Locker Room	" "	" "	" "	"	"	" "	"	"	"	" " " "
6	Shower	Ceramic Tile	1361 Tan	Ceramic Tile	733 Sand	Ceramic Tile	1361 Tan	Sheet Rock	Orange Peel	"	" " "
7	Storage	Plywood	Unfinished	Exposed Insul	White Vinyl	None		Exposed Insul	White Vinyl	varies	" " "

WINDOW SCHEDULE

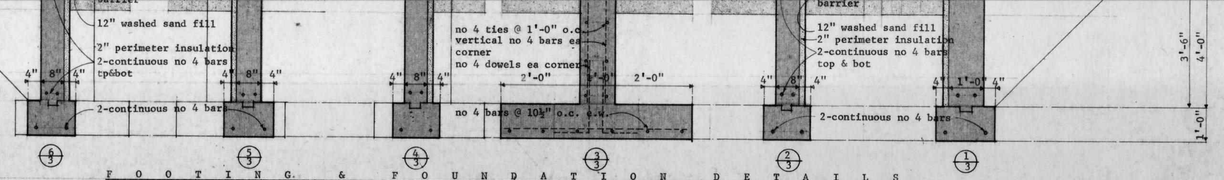
NO	MANUFACTURER	SERIES	UNIT NUMBER	FINISH	FRAMED OPENING	AMT	REMARKS
A	E.R. Young	1600	6050	Bronze		5	





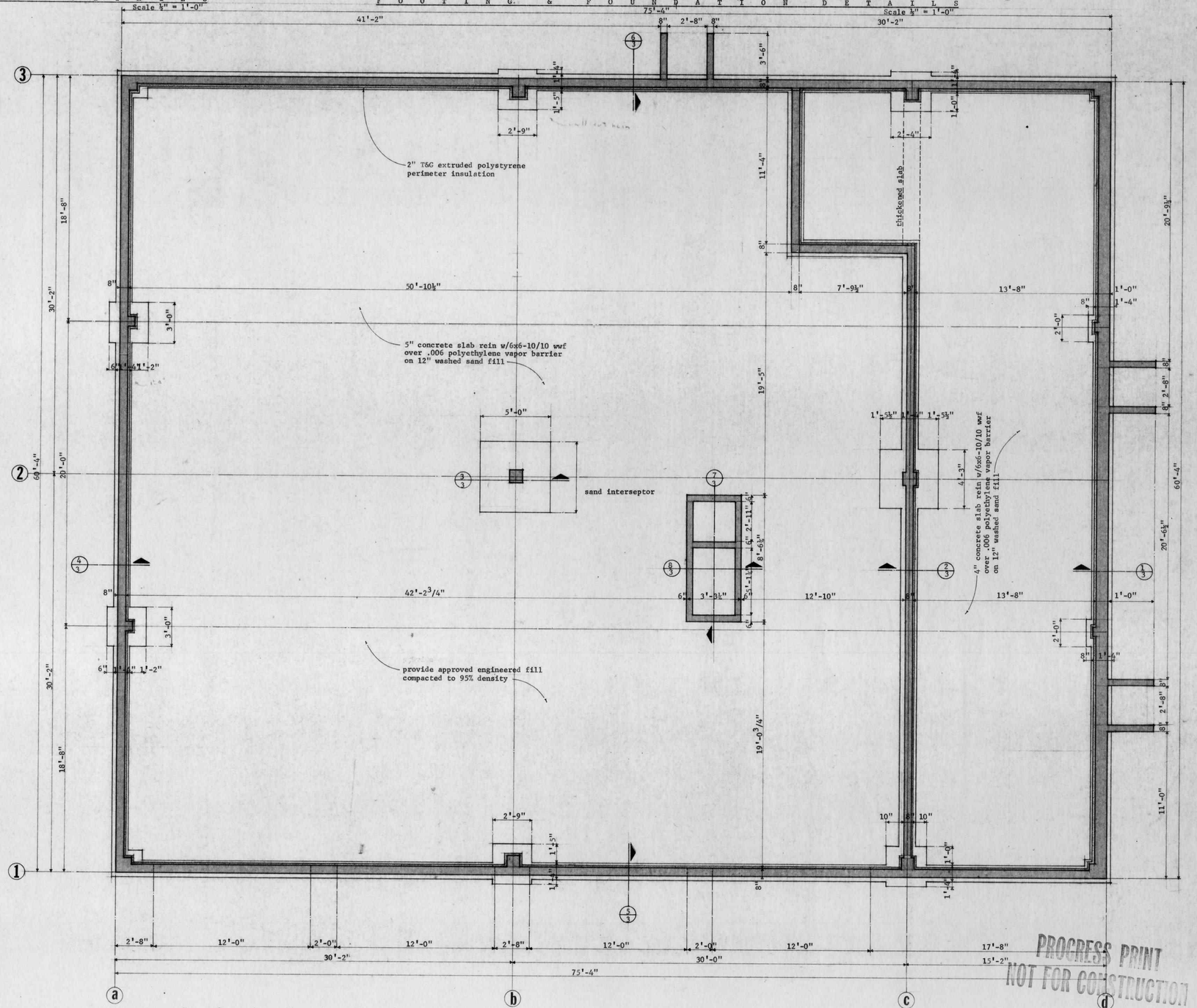


-S A N D I N T E R C E P T O R D E T A I L S



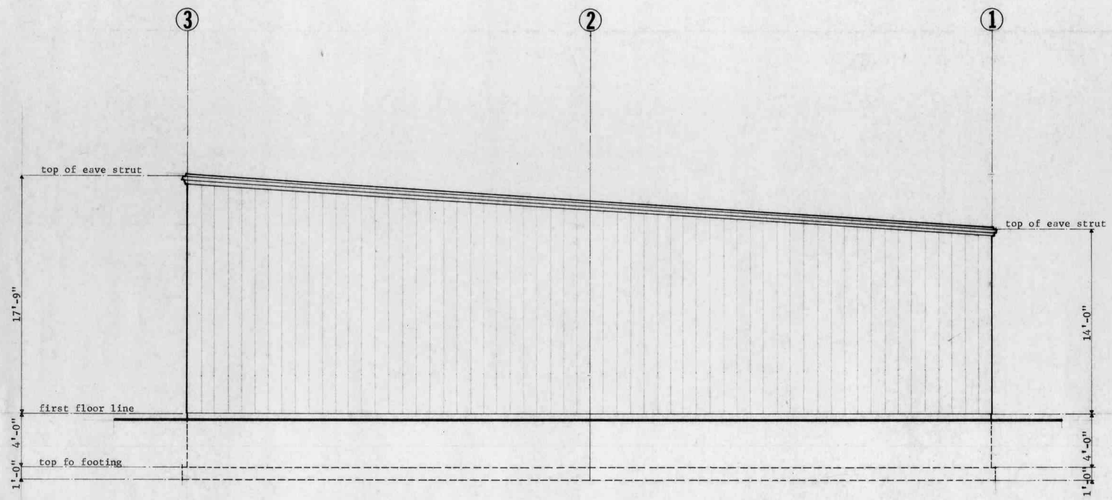
F O O T I N G & F O U N D A T I O N D E T A I L S

Scale ½" = 1'-0"

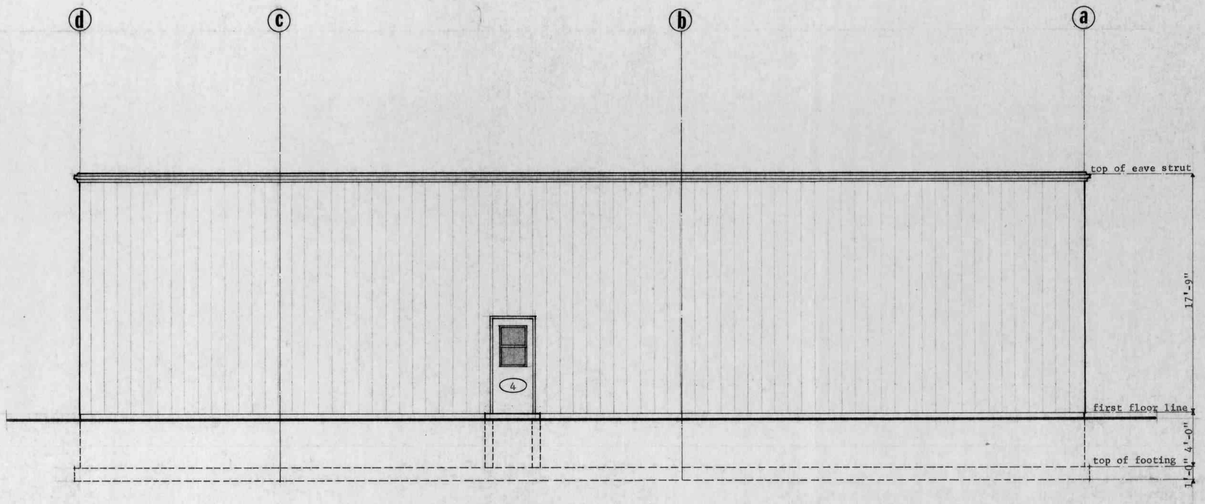


F O O T I N G & F O U N D A T I O N P L A N

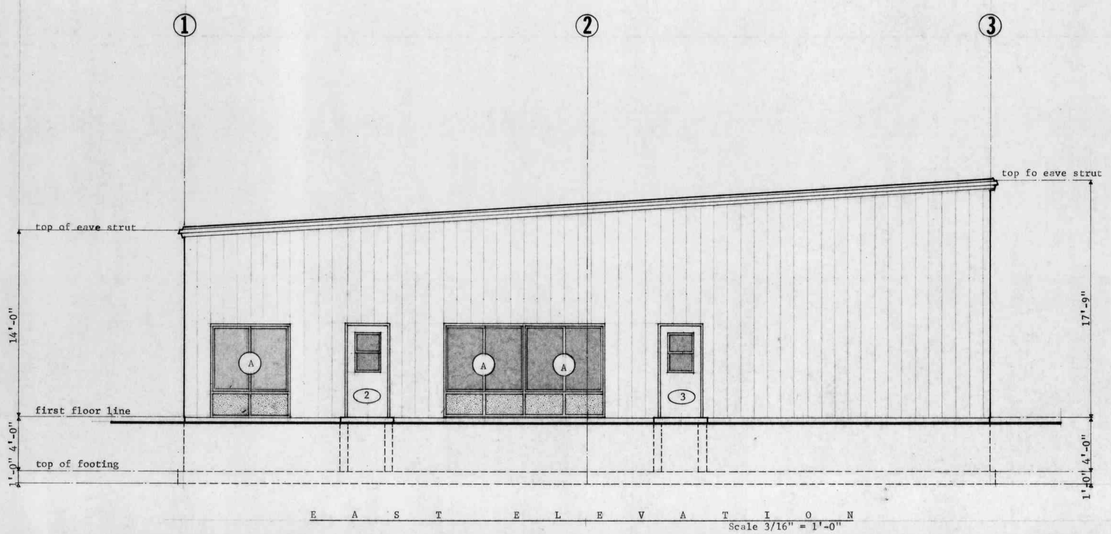
Scale ⅛" = 1'-0"



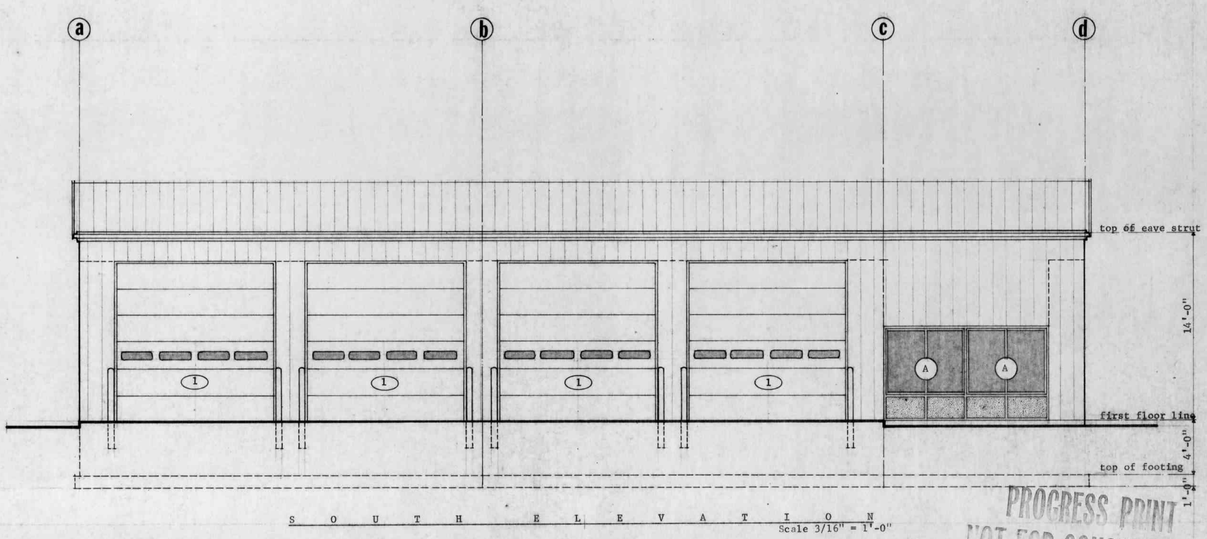
W E S T E L E V A T I O N
Scale 3/16" =1'-0"



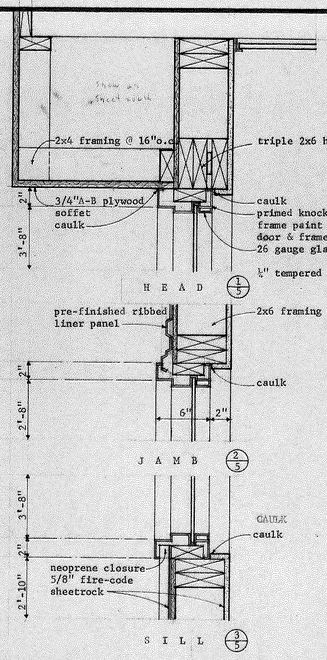
N O R T H E L E V A T I O N
Scale 3/16" = 1'-0"



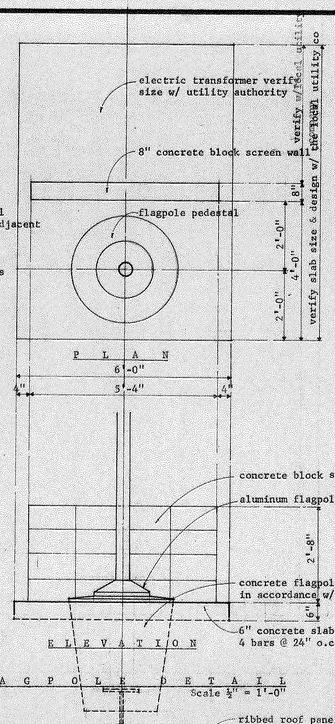
E A S T E L E V A T I O N
Scale 3/16" = 1'-0"



S O U T H E L E V A T I O N
Scale 3/16" = 1'-0"



O B S E R V A T I O N W I N D O W
Scale 1½" = 1'-0"



F L A G P O L E D E T A I L
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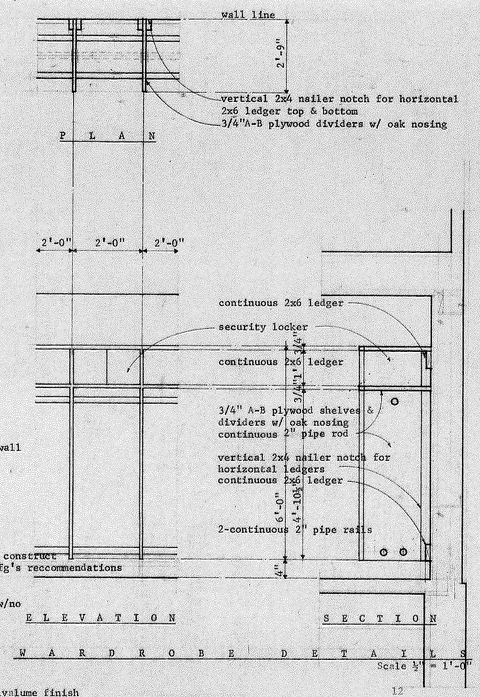
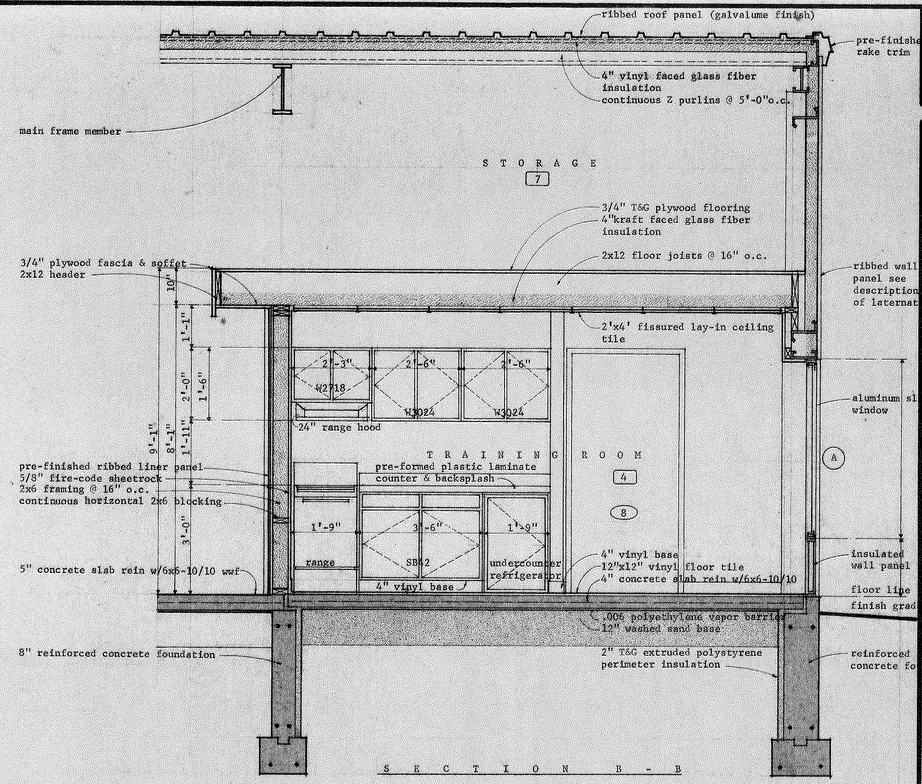
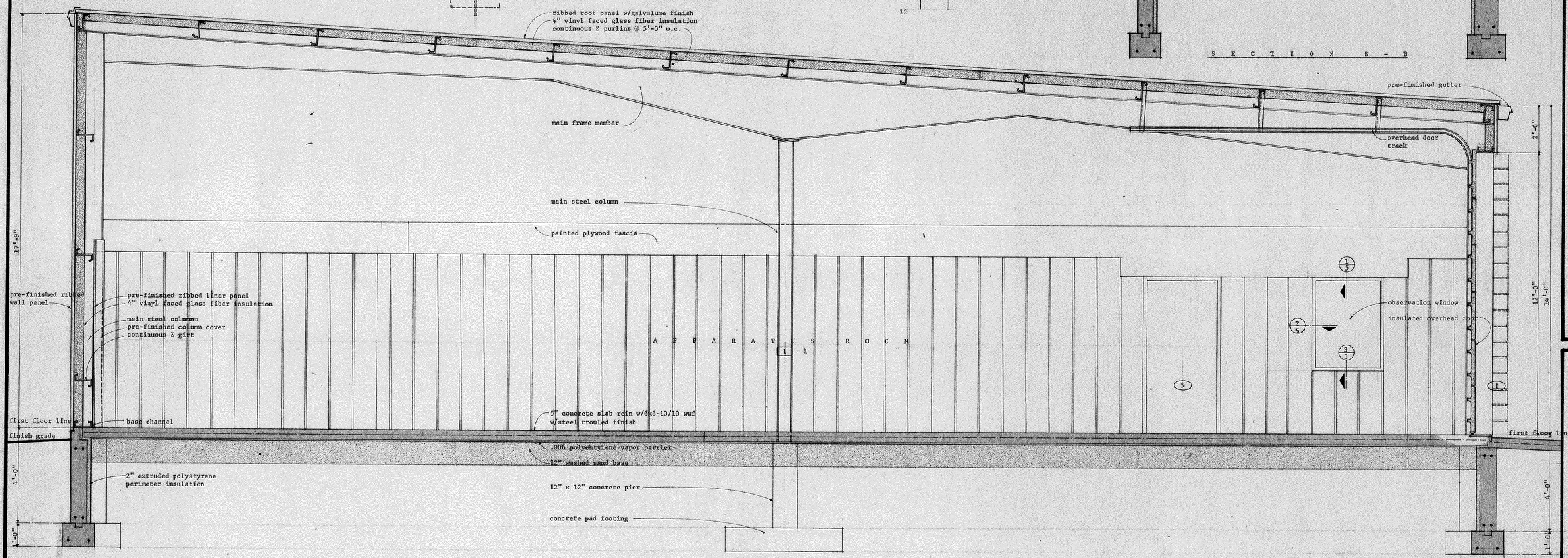


W A R D R O B E D E T A I L S
Scale ½" = 1'-0"



S E C T I O N B - B



S E C T I O N A - A
Scale ½" = 1'-0"

L I G H T F I X T U R E S C H E D U L E

MRK	LOCATION	AMT	MANUFACTURER	NUMBER	LAMPS	MOUNTING
A	Apparatus Room	20	Lithonia	EJ 296 HO	2-F96T12 CO/HO	Suspended 14' from floor
B	Office,Training&Locker	19	"	LB 240 A	2-F40 CW	Ceiling surface
C	Apparatus Room	3	"	UN 296	2-F96T12CW/HO	Underside of soffet
D	Shower Area	2	"	DV 240 A	2-F40 OW	Ceiling surface
E	Locker Room	1	"	22-HB A4 220 WD	2-F40	Wall
F	Training Room	1	Thomas	M-344	1-F18	Underside of wall cabinet
G	Exterior	3	Keene	323-70LX	1-70W HPS	Wall
H	Exterior	4	"	323-150LX-VP	1-150W HPS	Wall
I	Apparatus,Train&Corr	4	Sure-Lite	EA-1C-R	20T 6½	Wall ,Ceiling & face of Soffet

E X H A U S T F A N S C H E D U L E

MRK	LOCATION	AMT	MANUFACTURER	SERIES	POWER V	Ph	Hz	CFM	MOUNTING
EF-1	Shower Room	1	Nu Tone	8870	120	1	60	80	Thru-wall
EF-2	Storage Area	1	Penn	CD 24T4	120	1	60	5,500	thru-wall w/shutter

W A T E R H E A T E R S C H E D U L E

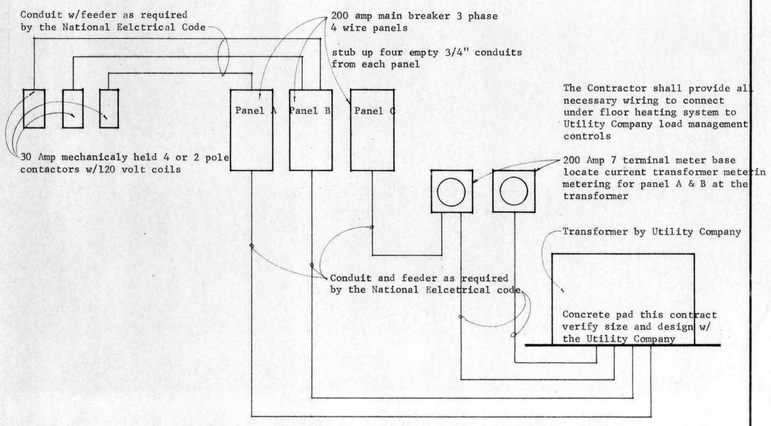
MRK	LOCATION	AMT	MANUFACTURER	SERIES	POWER V	Ph	Hz

P A N E L C 2 0 0 A m p M a i n B r e a k e r 3 P h a s e 4 W i r e

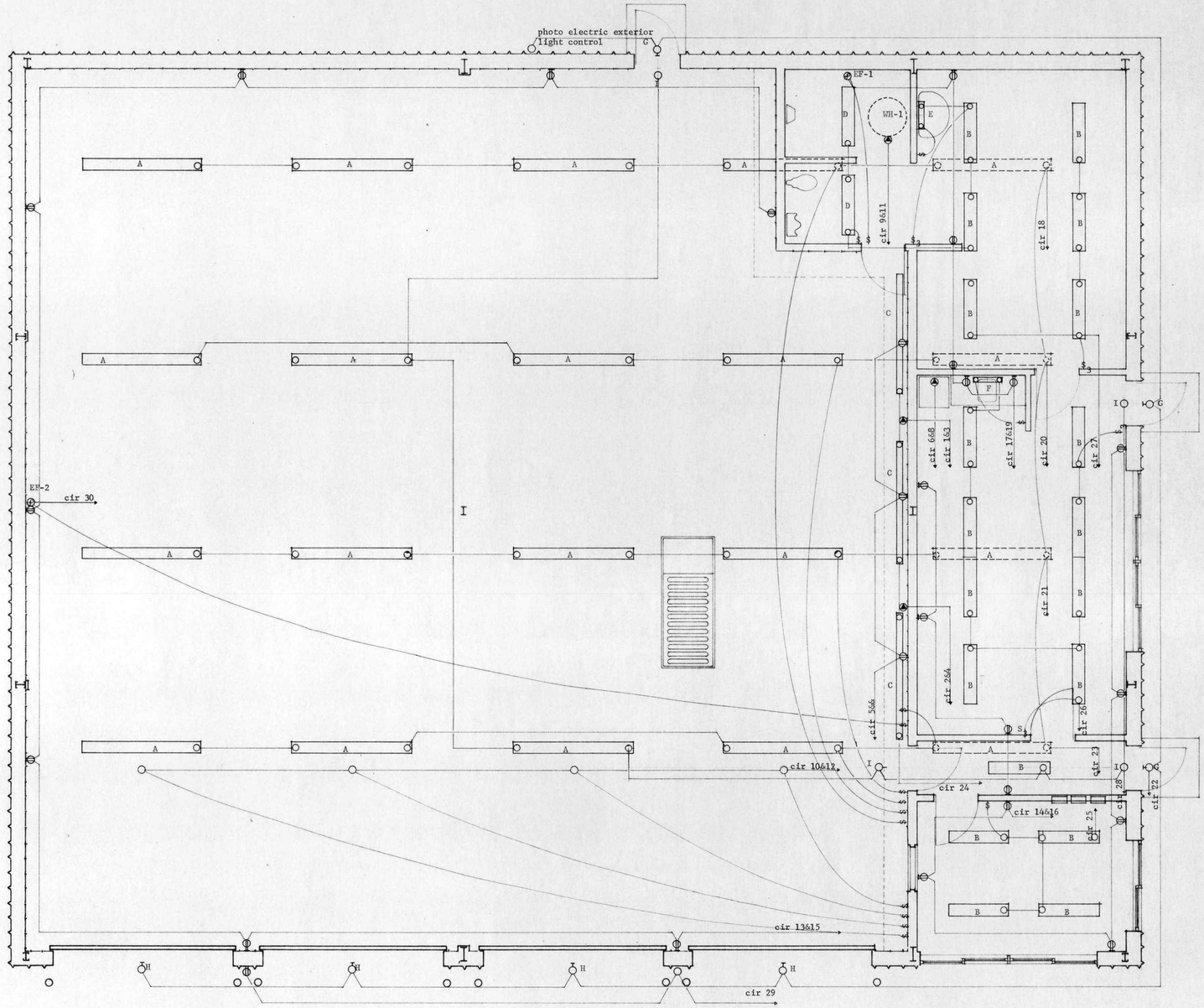
LOAD	AMP	CIR	CIR	AMP	LOAD
Work Bench Receptacle	20	1	2	50	Welder Receptacle
Work Bench Receptacle	20	3	4	50	Welder Receptacle
Work Bench Receptacle	20	5	6	50	Range
Work Bench Receptacle	20	7	8	50	Range
Water Heater	30	9	10	20	Door Operator
Water Heater	30	11	12	20	Door Operator
Main Area Receptacles	20	13	14	20	Dispatch,Training & Locker Receptacles
Main Area Receptacles	20	15	16	20	Dispatch,Training & Locker Receptacles
Locker & Kitchen Receptacles	20	17	18	20	Apparaturs & Storage Area lighting
Locker & Kitchen Receptacles	20	19	20	20	Apparatus & Storage Area lighting
Apparatus & Storage Area lighting	20	21	22	20	Exterior Lighting
Apparatus & Storage Area Lighting	20	23	24	20	Soffet Lighting
Dispatch Lighting	20	25	26	20	Training Room Lighting
Locker Room Lighting	20	27	28	20	Exit Lighting
Exterior Lighting	20	29	30	20	Exhaust Fan
Spare	20	31	32	20	Future Hose Dryer
Spare	20	33	34	20	Future Hose Dryer
Spare	20	35	36	20	Future Hose Dryer
Spare	20	37	38	20	Future Hose Dryer
Space					Space

N O T E

1. Office,Training and Locker Room Areas&Lighting and associated wiring shall be provided under alternate No 1
2. Conceal conduit stubed up from under floor heat cables to junction boxes and contactors behind wall liner panels
3. Install P&S 1200 door switch and rough in conduit from switch to above finished ceilings
4. Install all necessary conduit and wiring for 4 commercial door operators designated circuits 10 & 12
5. Control each ceiling suspended unit heater with one thermostat located adjacent to observation window



S W I T C H G E A R D I A G R A M E
no scale



F I R S T F L O O R E L E C T R I C A L P L A N
Scale ¼" = 1'-0"

PROGRESS PRINT
NOT FOR CONSTRUCTION

ELECTRIC HEAT CABLE SCHEDULE

MRK	LOCATION	MANUFACTURER	NUMBER	AMT	LENGTH	SPACING	W	A	BTU	V	REMARKS
1	Apparatus Room	Smith Gates	6P8-4000	4	636	8	4,000	16.7	13,468	208	
2	Apparatus & Train	" "	6P8-4500	4	699	8	4,500	18.8	15,354	208	
3	Apparatus & Train	" "	6P8-5000	1	629	8	5,000	20.8	17,060	208	

ELECTRIC UNIT HEATER SCHEDULE

MRK	LOCATION	MANUFACTURER	NUMBER	AMT	WATTS	BTU	VOLT	PHASE	CFM	REMARKS
UH-1	Apparatus Room	Berko	DUH-1520-A	2	15,000	51,195	208	3	1260	

PANEL A 200 Amp Main Breaker 3 Phase 4 Wire

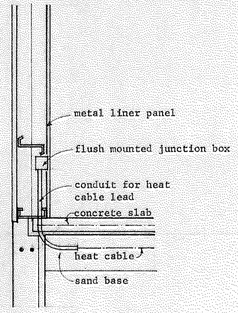
LOAD	AMP	CIR	CIR	AMP	LOAD
Floor Heat	30	1	2	30	Floor Heat
Floor Heat	30	3	4	30	Floor Heat
Floor Heat	30	5	6	30	Floor Heat
Floor Heat	30	7	8	30	Floor Heat
Floor Heat	30	9	10	30	Floor Heat
Floor Heat	30	11	12	30	Floor Heat
Floor Heat	30	13	14	30	Floor Heat
Floor Heat	30	15	16	30	Floor Heat
Floor Heat	30	17	18	30	Spare
Floor Heat	30	19	20	30	Spare
Space		21	22		Space
Space		23	24		Space
Space		25	26		Space
Space		27	28		Space
Space		29	30		Space

PANEL B 200 Amp Main Breaker 3 Phase 4 Wire

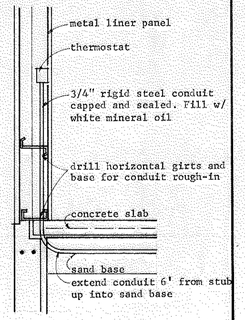
LOAD	AMP	CIR	CIR	AMP	LOAD
Unit Heater	90	1	2	90	Unit Heater
Unit Heater	90	3	4	90	Unit Heater
Unit Heater	90	5	6	90	Unit Heater
Unit Heater	90	7	8	90	Unit Heater
Unit Heater	90	9	10	90	Unit Heater
Unit Heater	90	11	12	90	Unit Heater
Space		13	14		Space
Space		15	16		Space
Space		17	18		Space
Space		19	20		Space
Space		21	22		Space
Space		23	24		Space
Space		25	26		Space
Space		27	28		Space
Space		29	30		Space

CONSTRUCTION NOTES

1. Conduct electrical continuity test on heat cable as follows
   a. When cables are removed from the carton
   b. After cables have placed in position
   c. After slab has been poured but prior to concrete setting
2. Maintain a minimum 3" cable spacing and distance from any building components
3. Install cable in sand base 8" below the underside of the concrete slab
4. Rough-in control thermostat capillary tube extended 6' horizontally in concrete slab
5. Extend thermo-cut off capillary tube 10' horizontally in sand base directly over heating cables



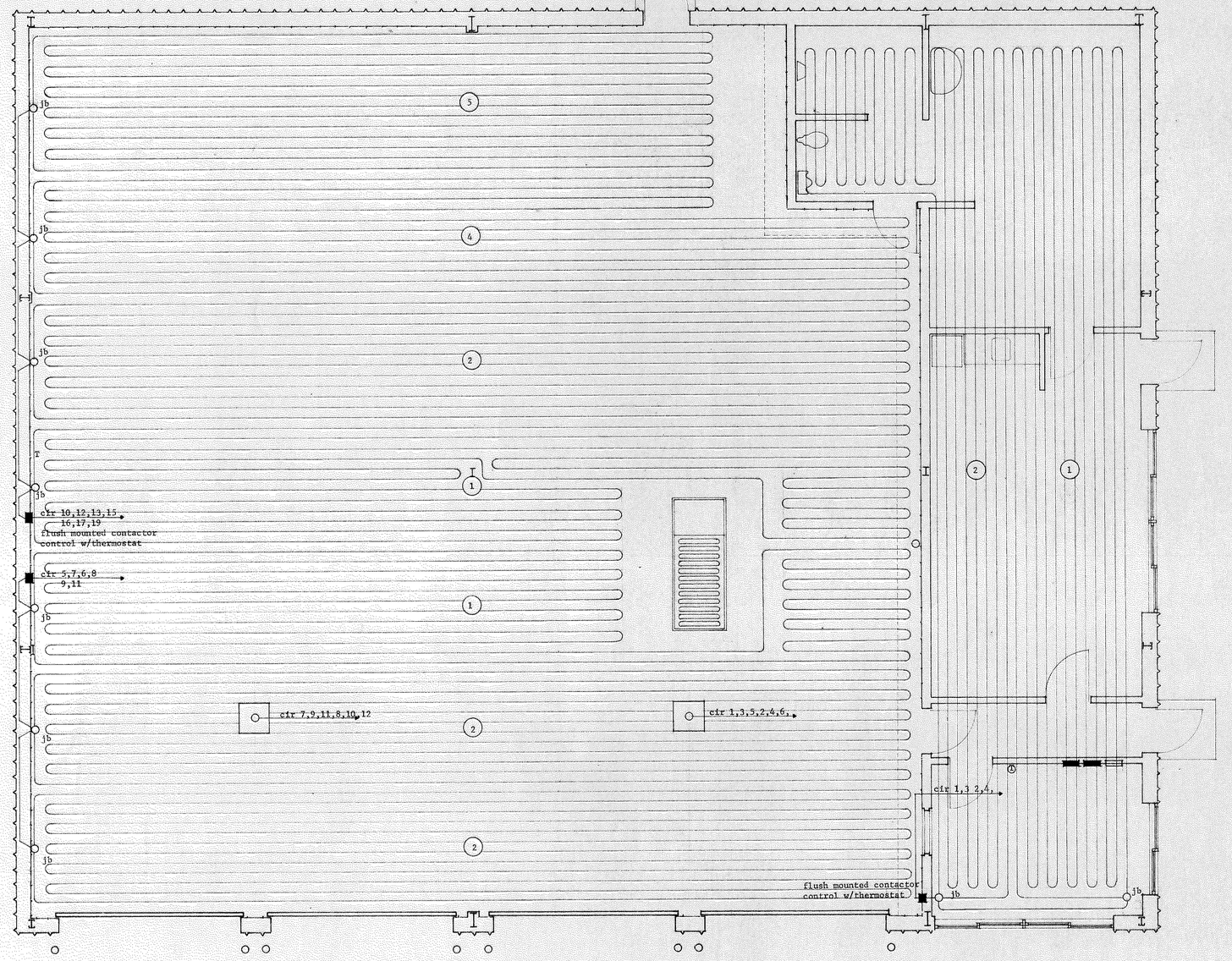
CONDUIT ROUGH-IN DETAIL
Scale ½" = 1'-0"



THERMOSTAT ROUGH-IN DETAIL
Scale ½" = 1'-0"

HEAT LOSS CALCULATION

NO	ROOM	WALL SQ FT	WALL U X T	WALL BTU/HR	CEILING SQ FT	CEILING U X T	CEILING BTU/HR	WINDOW SQ FT	WINDOW U X T	WINDOW BTU/HR	DOOR SQ FT	DOOR U X T	DOOR BTU/HR	FLOOR LIN FT	FLOOR BTU/F T	FLOOR BTU	INFILTRATION SQ or L F	INFILTRATION C F X 1.8	INFILTRATION BTU	TOTAL BTU	TOTAL WATTS
1	Apparatus	2,260	12	27,120	3,600	12	43,200	11	55	605	565	11	6,215	180	50	9,000	576 sq ft	3.6	3,732	89,872	26,340
											20	14	280				20 lin ft	30	1,080	1,360	399
2	Dispatch	105	12	1,260	150	1.1	165	90	55	4,950				25	50	1,250	48	12.6	1,088	8,713	2,554
		30	11	330																330	97
		78	1.3	101																101	30
		12	22.6	271																271	79
3	Corridor	16	12	192	60	1.1	66	6	113	678	14	14	196	4	50	200	20	30	1,080	2,412	706
		16	1.3	21							20	2.8	56							77	23
4	Training	116	12	1,392	360	1.1	396	60	55	3,300	20	14	280	24	50	1,200	32	12.6	726	7,294	2,138
		20	11	220													20	30	1,080	1,300	381
		216	1.3	281																281	82
5	Locker Room	396	12	4,752	417	1.1	459				20	2.8	56	44	50	2,200				7,467	2,188
		241	1.3	313																313	92
7	Storage	1,428	12	17,136	900	12	10,800													12,536	3,674



FIRST FLOOR ELECTRIC HEAT PLAN
Scale ⅛" = 1'-0"

PLUMBING FIXTURE SCHEDULE

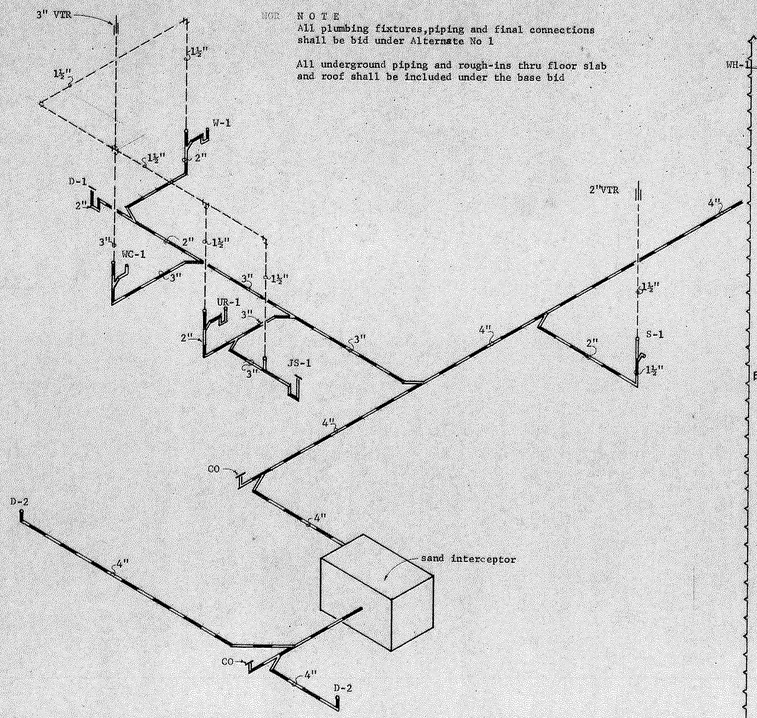
MRK	AMT	TYPE	MOUNTING	CONNECTIONS CW	HW	WASTE	VENT	MANUFACTURER	NUMBER	REMARKS
WC-1	1	Floor set elongated		1"		3"	1½"	American Standard	Medera # 2221.018 w/#5334 seat and #110-3 Sloan flush valve	
UR-1	1	Wall hung siphon jet	24" to rim	3/4"		2"	1½"	American Standard	Trimbrook # 6560015 w/ # 186YB Sloan flush valve	
S-1	1	Stainless steel sink		½"	½"	2"	1½"	Just	# 17519 ARG-1 w/ Chicago # 50-E3 faucet ,#J-35 strainer ,17 ga trap and stop valves	
W-1	1	semi circular floor mounter wash fountain		3/4	3/4	2"	1½"	Bradly	# CFC-36 w/terrazzo bowel and standard equipment	
SH1	1	wall mounted three person shower	head 6' to fl	3/4"	3/4"			Bradly	#3WMT-TVST	
D-1	1	Shower drain				2"		J.R. Smith	# 2005-A w/5" nickel bronze top	

PLUMBING FIXTURE SCHEDULE

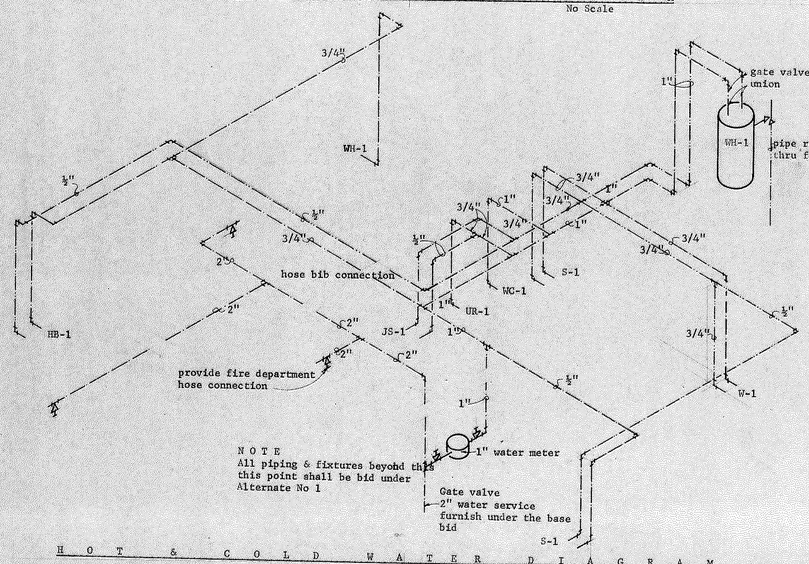
MRK	AMT	TYPE	MOUNTING	CONNECTIONS CW	HW	WASTE	VENT	MANUFACTURER	NUMBER	REMARKS
D-2	2	Heavy duty floor drain				4"		J.R. Smith	#2233 w/ sediment bucket and tractor grate	
CO-1	3					4"		J.R. Smith	#4220 w/ cast iron top	
WH-1	1	Wall Hydrant	24" above grade	½"	½"			Woodford	# 65C	
HB-1	1	Hose Bib	42" above floor	½"	½"			Chicago	#897RCF	
JS-1	1	Floor set Janitor sink		½"	½"	3"	1½"	Fiat	# MSB-2424 w/ Chicago # 897 RCF # 832AA Hose and bracket and # 889CC	

NOTE
All plumbing fixtures,piping and final connections shall be bid under Alternate No 1

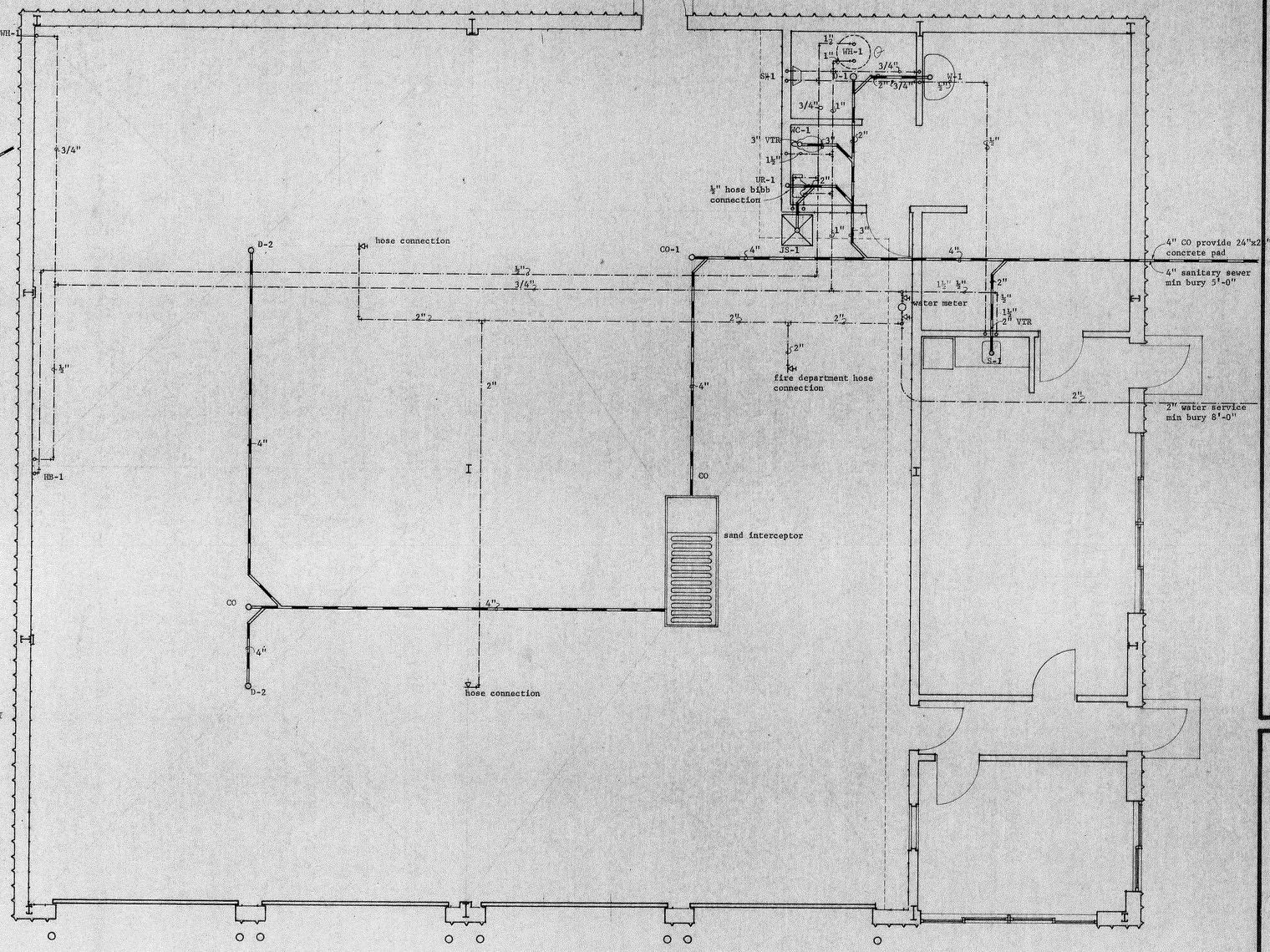
All underground piping and rough-ins thru floor slab and roof shall be included under the base bid



WASTE & VENT DIAGRAM
No Scale



HOT & COLD WATER DIAGRAM
No SCale



FIRST FLOOR PLUMBING PLAN
Scale ¼" = 1'-0"

PROGRESS PRINT
NOT FOR CONSTRUCTION