Inver Grove Heights
Minnesota

Feasibility and Programming Study

February 2, 2015

FIVE BUGLES DESIGN

PREDESIGN FEASIBILITY STUDY APPROVAL

This document has been reviewed and approved for overall scope of work, arrangement, flow, spatial adjacencies, estimated schedule and cost.

_____

Joe Lynch
City Administrator date

_____

Judy Thill
Fire Chief date

February 2, 2015

Project No.
14-056

Owner
City of Inver Grove Heights
8150 Barbara Avenue
Inver Grove Heights, MN 55076

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FIVE BUGLES DESIGN

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Inver Grove Heights Fire Station Feasibility and Programming Study

ADG/Five Bugles Design is pleased to present this Feasibility Study for Inver Grove Heights' proposed new fire station. The study is the result of multiple meetings with fire staff and local officials.

Our Design Methodology Format:

1. Site Selection
2. Analysis of Selected Site
3. Project Programming: Space Needs Analysis
4. Architectural Concept Design – Bubble Programming
5. Schematic Design

Background and Study Schedule

Five Bugles Design was selected by the City of Inver Grove Heights for the Inver Grove Heights Fire Station Feasibility and Programming Study after a QBS, Quality Based Selection process. The initial Five Bugles Design Statement of Qualifications was submitted to Judy Thill, Fire Chief and Joe Lynch, City Administrator on July 1, 2014. Following a review process, Five Bugles Design was shortlisted and interviewed with the selection committee on July 30, 2014.

The Inver Grove Heights City Council approved the selection and Five Bugles contract on August 5, 2014.

July 30, 2014
Inver Grove Interview

August 4, 2014
Kick off - Ed Mishefske, Rob Krzyzanowski, and Steve Gausman conducted a kick-off meeting with the Inver Grove Heights City Administrator Joe Lynch, Fire Chief Judy Thill, Assistant Fire Chief Eric Bergum, Captain John Patrande, Captain Joe Wepoer, Lieutenant Scott Oswald, Lieutenant Neal St. Orge and Firefighter Jeff Davis.

August 12, 2014
Programming

September 3, 2014
Programming - A copy of the Space Needs Report is included within the body of this report.

September 5, 2014

Site grading

September 11, 2014
Site review – Program review

September 22, 2014
Inver Grove Schematic review

September 29, 2014
Inver Grove Schematic review

October 6, 2014
Inver Grove Council work session

November 23, 2014
Inver Grove Building Committee presentation

Site Selection Process:

On Sept 5 and Sept 11, the Five Bugles team met with the building committee to perform an analysis of six potential sites City staff had brought forward for consideration.

1. Property A

2. Property B

3. Property C

4. Property D

5. Property E

6. Property F

The potential sites were numerically graded on the following criteria:

Effective Size - Does the site allow the total department space program to be adequately constructed?

Future Growth Potential – Does the site provide for future growth based upon new community expectations for delivery services?

Accessibility to adequate response routes - Does the site allow for fast access to major transportation systems that allow rapid response?

Proximity to local "Target Hazards". – Is the site in a place for a rapid response to facilities that could have increased fire spread or health related issues? These could be factories using chemicals, high volume flammable gas storage, older building such as the downtown that could experience rapid flame spread, senior citizens living or health care facilities, etc.

Location to community growth patterns – Is the site going to become ineffective, or will there be increased response times as the community grows in different directions?

Political Considerations – Are there political reasons that the site would be more or less appealing as a station location such as donated land, infrastructure costs that tax the community budget, or community pressures?

Commercial value to the community tax base – Is the site more valuable to the community as a commercial property than to be taken off the tax role as a fire/EMS station?

Municipal water supply – Is there domestic water at the desired volume and pressure at the site, or a high volume well capable of servicing fire apparatus?

Location relative to firefighter homers – Is the site impacted by the locations of the firefighters homes in relationship to effective response times to the new site?

Location of firefighters work locations – Is the site impacted by the location of the firefighters workplaces in relationship to response times to the new site?

Public access and visibility – Does the site provide good public access and visibility to satisfy community expectations?

Municipal storm water accessibility - Is there storm water access at the site?

Municipal sanitary sewer available – Is there a sewer system on the site or is there a septic system?

Storm water retention availability – Is there sufficient space for storm water retention without limiting the scope of the building and parking areas?

Electricity availability – Is there sufficient electrical resources provided at the site?

Natural gas availability – Is there natural gas availability at the site?

Environmental issues – Does the site pose any environmental issues that could impact station development or increase the construction costs as a result of cleanup?

Water drainage potential problems – Are there any potential water issues that could impact development of the site such as annual flooding, high ground water, or run-off?

Soil conditions – Are there any soil conditions that could impact the site development costs such as rock base, poor soils, wet soils etc.?

Grade issues - Are there grade issue that would hamper the total site development budget?

Traffic hazards – Are there any impediments to fire and EMS response from the site, such as heavy traffic, schools, churches, street widths, weight limitations, etc.?

Proximity to other stations – Does the site fit into the overall station location scheme of the community?

Location relative to the area served – Does the site meet the needs of the community both presently and in the future?

Costs

Site acquisition – Are the site acquisition costs in line with the project costs; are the acquisition costs favorable or unfavorable?

Site development – Does the costs of site development impact the total project? Poor soil, soil contamination, rock formations, etc. can all greatly increase development costs and change a site from a very appealing location to one that is not.

Installation of utilities – Does the cost of providing utilities to the site increase the overall costs to where another site with existing utilities may be more favorable?

Road development – Is there a requirement to develop a new road or access route or to upgrade an existing road or access to the site that could increase the costs and make a different site more appealing?

Site Selection and Assessment Conclusions: (as submitted by Edward Mishefske)

After reviewing the accumulated point totals for each individual site that was reviewed by the station committee on September 15, 2014, the results are as follows:

Property A	757 points
Property B	740 points
Property C	734 points
Property D	700.5 points
Property E	685.5 points
Property F	638 points

A sample Fire Station Site Evaluation form follows, for review:

Fire Station Site Evaluation Form

Rate each site on a scale of one through five with 5 being Strongly Agree and 1 being Strongly Disagree.

Location:				Rater:			
	STRONGLY AGREE (5)	AGREE (4)	NEITHER AGREE NOR DISAGREE (3)	DISAGREE (2)	STRONGLY DISAGREE (1)		**ROW TOTAL**
SITE:							
Effective Size							0
Future Growth Potential							0
Accessibility of site to Adequate Response Routes							0
Proximity to Local Target Hazards							0
Location to Community Growth Patterns							0
Political Considerations							0
Commercial Value to Community Tax Base							0
Community Considerations							0
Municipal Water Availability							0
Public Access & Visibility							0
Municipal Storm Sewer Availablility							0
Municipal Sanitary Sewer Availability							0
Storm Retention Availability							0
Electricity Availability							0
Natural Gas Availability							0
Environmental issues: (contaminates, etc.)							0
Water Drainage Potential Problems							0
Soil Conditions (swamp, rock, fill, etc.)							0
Grade Issues (major slopes, etc.)							0
Traffic Hazards (non-controlled interestion(s), excessive traffic, school zones, shopping areas, etc.)							0
Proximity to other Fire Stations							0
Location Relative to Area Served							0
COSTS:							
Site Acquisition							0
Site Development (demolition, soils, contamination,etc.)							0
Installation of Utilities							0
Road Development							0
TOTAL SCORE:							0

Site Assessment

The selected Property A is a multiple acreage parcel bordered on three sides by streets/highways. It is anticipated the total required site will be between 5 and 6 acres. At present, the site is not serviced by utilities.

The site is relatively undeveloped and consists of rolling forest land with a small pond. Topographical features of the site include elevation differences of 40 feet. Site egress for both fire apparatus and the public will be via a city street. We anticipate extensively re-grading the knoll to provide adequate cut and fill to allow the drive construction. The proposed station site will provide for prominent viewing of the new facility from several streets/highways.

Site development schematics have been created, but it is important to note that neither a site survey nor soil borings have been provided. Our design team has modeled the costs for placing the building at a number of different elevations for your review.

Please note our assumptions:

1) A wetland or floodplain inventory was not conducted.

2) These numbers assume that we are permitted to grade along the north. If not, a retaining wall would be required along that property line, or the layout would need to be moved southeast (see assumption #5).

3) These numbers are from the top of proposed surface to the top of existing surface, so it does not take into account the proposed pavement surfaces or the existing topsoil to be removed/replaced.

4) This assumes that the existing pond on site or the existing low point can be utilized for stormwater management.

5) These numbers assume this building will be in that exact location, however, it is most likely necessary to move the whole site layout to the southwest to accommodate the grading and matching in to existing grades at the property line.

6) These numbers are based on the C-101 – SITE MAP.pdf and C-102 – SITE PLAN – OPTION 1.pdf that was sent to me on October 8, 2014.

7) Given the information below, it may make sense for the finish floor elevation of the building to be around elevation 956 to elevation 957.

8) These costs are based on typical prices we have seen on recent bids.

Finish Floor Elevation = 960
Area of land disturbance: 105,690 sf
Cut Volume: 4,000 CY (5,200 CY assuming 305 slump factor)
Fill Volume: 15,400 CY
Net: Will need to bring in 10,200 CY to site, assuming a 30% slump factor on the cut
Requires a 12′ tall x 300′ long retaining wall along the arterial road side.

Costs (**Total = $409,000**):
Retaining Wall: According to the 2013 RS Means (and interpolation), a 12′ tall Cast-in-Place Concrete Retaining wall would cost about $700/LF. Total cost of this retaining wall would be **$210,000**.

Earthwork: Moving dirt around onsite would cost about $5/CY, for the Cut material, that would cost **$26,000**. For the trucked in fill material, that would cost about $15/CY, so it would cost $153,000. Total for excavation it would be around **$173,000**.

Finish Floor Elevation = 955
Area of land disturbance: 99,540 sf
Cut Volume: 9,600 CY (12,480 assuming 30% slump factor)
Fill Volume: 8,300 CY
Net: Will need to lose 4,180 CY on site, assuming a 30% slump factor on the cut
Requires a 8′ tall x 160′ long retaining wall along the arterial road side.

Costs (**Total = $117,600**):

Retaining Wall: According to the 2013 RS Means, a 8′ tall Cast-in-Place Concrete Retaining wall would cost about $345/LF. Total cost of this retaining wall would be **$55,200**.

Earthwork: Moving dirt around onsite would cost about $5/CY, for the Cut material, that would cost **$62,400**. There wouldn't need to be any trucked in fill. I believe we could lose the remainder 4,180 CY in that saddle area for fill.

Finish Floor Elevation = 950
Area of land disturbance: 95,580 sf
Cut Volume: 19,560 CY (25,428 assuming 30% slump factor)
Fill Volume: 2,140 CY
Net: Will need to lose 23,288 CY on site, assuming a 30% slump factor on the cut
Does not require a retaining wall.

Costs (**Total = $127,140**):

Earthwork: Moving dirt around onsite would cost about $5/CY, for the Cut material, that would cost **$127,140**. There wouldn't need to be any trucked in fill, however, losing +23,000 CY in that saddle area or somewhere on the site could be difficult. I am not sure if construction fill in that area is easy to come by, but they may have to pay someone to get rid of some of that fill.

Submitted by,
Tyler Smith, PE, CPESC, NRCS TSP
GRAEF Project Engineer
5126 W. Terrace Drive, Suite 111, Madison, WI 53718-8343

Project Programming: Space Needs Analysis

Five Bugles Design staff conducted a Programming Session with City staff on September 3, 2014.. The primary purpose of programming is to examine the fire department operations, including existing and anticipated space needs, as well as to consider future goals and expectations.
At the core of every successful and efficient fire protection program is fire department training. Community expectations for delivery services over the last decade have grown to a level never anticipated. Emergency medical services, hazardous materials, confined entry rescue, fire ground management techniques, communications, domestic and international terrorism are not hypothetical scenarios but realities. Designing many fire service training opportunities into the new station is critical to a department's level of ability to face the new challenges that these situations present.
In our discussions during the initial programming phase, we spent a great deal of time talking about the department's exiting training programs. We gathered significant information and then offered design solutions that provide for in-house training, including the use of a hose tower for both drying fire hoses and for practicing in a multi-story internal/external learning platform. This design feature includes:

- Orienting the tower to allow access on three sides
- Windows or window openings with covers to simulate second story ladder rescue
- An internal stairway to extend hand lines to an upper story
- A standpipe pump-in connection system to the outside of the tower and standpipe connections at each level of the tower
- The building sprinkler system pump-in station is also used to simulate sprinkler water and pressure support.

As noted earlier, site specific topography also offers additional training opportunities. A copy of the Programming spreadsheet is included in the report for your review.

In summary, the required size of the fire station based on the program statement:

Fire Department Apparatus	12,800 square feet
Fire Department Administration and Living Space	14,838 square feet
TOTAL BUILDING SIZE PER PROGRAM	**27,638 square feet**

The total building size of 27, 638 sq. ft., as arrived at through programming sessions, serves as a an initial design starting point. During the Design Process and through multiple plan options and revisions, the final Schematic Design was reduce d to 23, 625 sq. ft. plus a 4000 square foot basement.

SPACE NEEDS SUMMARY

Project: Inver Grove Heights Fire Department

Location: Inver Grove Heights, MN

Initial Programming Date: September 3, 2014

Revised Programming Date: September 22, 2014

Apparatus Floor

Fire Department Apparatus	Length	x	Width	=	Ft²	Quantity	Total Ft²	Notes
Engines	40	x	16	=	640	1	640	full size plan
Ladder/Snorkel	60	x	16	=	960	1	960	future
Telesquirt		x		=	0	0	0	
Rescue Pumper	40	x	16	=	640	1	640	Heavy rescue size of engine
Boat/Trailer	40	x	16	=	640	1	640	Plan future grant
Arson Unit		x		=	0	0	0	
Utility/Pickup	30	x	16	=	480	2	960	Suburban size
Haz Mat	40	x	16	=	640	1	640	Special Ops team S.O.T. Trailer
Haz Mat-Diking/Booming		x		=	0	0	0	
Portable Pump/Trailer		x		=	0	0	0	
Snowmobile/ATV/Trailer	25	x	16	=	400	1	400	trailer
Firefighter Rehab Unit		x		=	0	0	0	
Tanker	40	x	16	=	640	1	640	3,000 Gallon tandem
Command Vehicle	20	x	16	=	320	1	320	Suburban
Public Education Storage		x		=	0	0	0	
Portable Lighting		x		=	0	0	0	
Police Vehicle		x		=	0	0	0	
Vehicle Maintenance Bay		x		=	0	0	0	
Brush Buggy		x		=	0	0	0	
Survive Alive Trailer		x		=	0	0	0	
Mass Casualty		x		=	0	0	0	
Protective Gear Locker	30	x	12	=	360	Yes	360	Lockers: 30 plus 5 above
Dirty Restroom	6	x	8	=	48	1	48	
Training Tower	12	x	30	=	360	1	360	
Wash Bay	18	x	80	=	1440	1	1440	
Training Prop Storage	40	x	16	=	640	1	640	Forced entry prop
Mezzanine		x		=	0	Yes	0	Entanglement Prop
Detached garage		x		=	0	Yes	0	Explore on site plan
Other		x		=	0		0	
Other		x		=	0		0	
Snowblower Storage	14	x	16	=	224	1	224	Exterior Storage
Other		x		=	0		0	
Other		x		=	0		0	
EMS								
EMS Command Vehicle		x		=	0		0	
Ambulance		x		=	0		0	
Mass Casualty Trailer		x		=	0		0	
Other		x		=	0		0	
Other		x		=	0		0	
							8,912	Subtotal (Ft²)
							2,228	Efficiency Ratio of 25%
							11,140	Fire Department Program (Ft²)

Apparatus Sizing Table (Ft²)							8,912
Number of Bays		3	4	5	6	7	8
		Length					
		80	104	128	152	176	200
Depth	60	4800	6240	7680	9120	10560	12000
	80	6400	8320	10240	12160	14080	16000
	100	8000	10400	12800	15200	17600	20000

Matrix Calculated Total Apparatus Space 12, 800 s.f.

Space Needs Summary

Inver Grove Heights Fire Department

Inver Grove Heights, MN **Wednesday, September 03, 2014**

Living/Administration/Apparatus Support Spaces

Fire Department Office	Length	x	Width	=	Ft²	Quantity	Total Ft²	Notes
Inspector/Pub. Ed		x		=	0	0	0	
Offices	12	x	16	=	192	4	768	Office title in flux - 4 total
Charitable		x		=	0		0	
Study/Work Area	12	x	16	=	192	1	192	
Resource Library	12	x	16	=	192	1	192	
Secretary's Office		x		=	0	0	0	
Station Dispatch Office	12	x	16	=	192	1	192	
Training and Pub-Ed Office	12	x	24	=	288	1	288	Need room for 3 cubicles
Training Room	40	x	54	=	2160	1	2160	house 50
Training Room Storage	20	x	20	=	400	1	400	yes
Communications/ IT	10	x	8	=	80	1	80	
Office/Storage	10	x	12	=	120	1	120	
Record/Report Storage	12	x	16	=	192	1	192	
Relief Association	10	x	12	=	120	1	120	plan for it
Conference Room	12	x	14	=	168	1	168	12 staff
Exercise Room	40	x	40	=	1600	1	1600	P.D. to use / add shower
Day Room	20	x	26	=	520	1	520	yes
Bedroom	10	x	12	=	120	6	720	
Kitchenette/Dining	20	x	24	=	480	1	480	
Restrooms/Showers	8	x	12	=	96	2	192	
Locker Room	20	x	18	=	360	1	360	Lockers for 20-50
Work Room/SCBA	16	x	16	=	256	1	256	Bottles stored on app
Laundry Room	16	x	10	=	160	1	160	plus extractor SS sink
Compressor/SCBA Room	10	x	10	=	100	1	100	
Hose Dryer		x		=	0		0	
Second Level Storage		x		=	0		0	
Vehicle Maintenance Room		x		=	0		0	
Janitor's Closet	5	x	5	=	25	2	50	
Mechanical	20	x	45	=	900	1	900	
Entrance Vestibule	10	x	12	=	120	1	120	
Lower Level Stairs	12	x	26	=	312	2	624	
Misc. Supplies		x		=	0		0	
Other Storage		x		=	0		0	
Elevator	10	x	10	=	100	1	100	
Public toilets off lobby	12	x	12	=	144	2	288	
Engineers Work Room	12	x	12	=	144	1	144	
Basement		x		=	0		0	yes
Lobby:Antiques	16	x	24	=	384	1	384	yes, but no apparatus
Other		x		=	0		0	
Other		x		=	0		0	

11,870	Subtotal (Ft²)
2,968	Efficiency Ratio of 25%

14,838	Administration/Office Spaces (Ft²)

SPACE NEEDS SUMMARY

Propject: Inver Grove Heights Fire Department

Location: Inver Grove, MN **Date: September 3, 2014**

Site

Site Program	Length	x	Width	=	Ft^2	Quantity	Total Ft^2	Notes
Fire Staff Parking		x		=	0	20	0	
Public Parking		x		=	0	15	0	
Fire Apparatus Apron		x		=	0	2	0	
Outdoor Training		x		=	0	1	0	
Outdoor Patio		x		=	0	1	0	
Enclosed Dumpster		x		=	0	1	0	enclosure required
External Generator		x		=	0	1	0	whole building
Storm Water Treatment		x		=	0	0	0	
Heliport Pad		x		=	0	0	0	Notes
Extrication Pavement		x		=	0		0	
Other		x		=	0	0	0	

0	Subtotal (Ft^2)
0	Efficiency Ratio of 20%

0	**Site Program Total (Ft^2)**

Space Needs Summary

Inver Grove Heights Fire Department

Inver Grove Hieghts, MN | Wednesday, September 03, 2014

Totals

Matrix Calculated Total Fire Department Apparatus	12,800
Fire Department Office, Administrative & Living Space	14,838

27,638	Station Footprint (Ft^2)

Schematic Design

During the Schematic Design process, the Five Bugles Design Team developed multiple conceptual solutions with corresponding site plans, floor plans and building elevations. Each solution was developed to scale and addressed criteria stipulated in the programming sessions and further discussed in charrette sessions and email exchanges. Construction types, operational needs, training, future phasing and expansion needs were considered and established. Green/sustainable/LEED criteria were also incorporated into the selected design.

Construction and Finish Assemblies

The Five Bugles Design Team has provided wall sections depicting construction and finish assemblies. Our design methodology is focused on providing Inver Grove Heights with a high value facility similar to what is commonly called a “fifty year building” within the industry.

SITE DEVELOPMENT PLAN ILLUSTRATING BUILDING ORIENTATION TO THE SITE WITH EGRESS TO A SECONDARY ROAD AND MAXIMUM VISIBILITY FROM A HIGHWAY

1 SITE MAP
1" = 40'-0"

NORTH

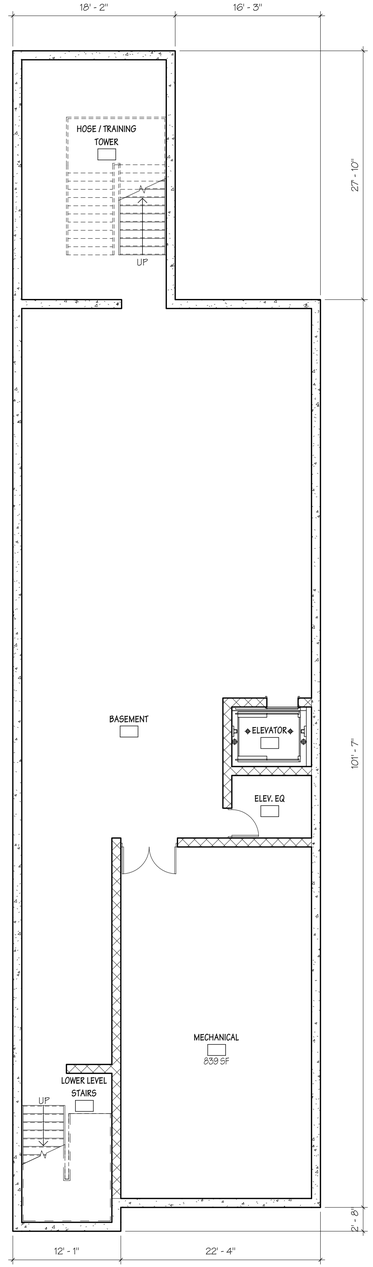
INVER GROVE HEIGHTS FIRE DEPARTMENT

SD.1-01.28.2015

INVER GROVE HEIGHTS, MN

FIVE BUGLES DESIGN

PROJECT NUMBER: 14-056



BUILDING SQUARE FOOTAGE	
FIRST FLOOR ADMINISTRATION	= 9,125 SF
APPARATUS BAY	= 8,500 SF
SECOND LEVEL	= 6,000 SF
TOTAL	= 23,625 SF

BASEMENT	= 4,000 SF

1 LOWER LEVEL
1/8" = 1'-0"

NORTH

INVER GROVE HEIGHTS FIRE DEPARTMENT

SD.1-01.05.2015

INVER GROVE HEIGHTS, MN

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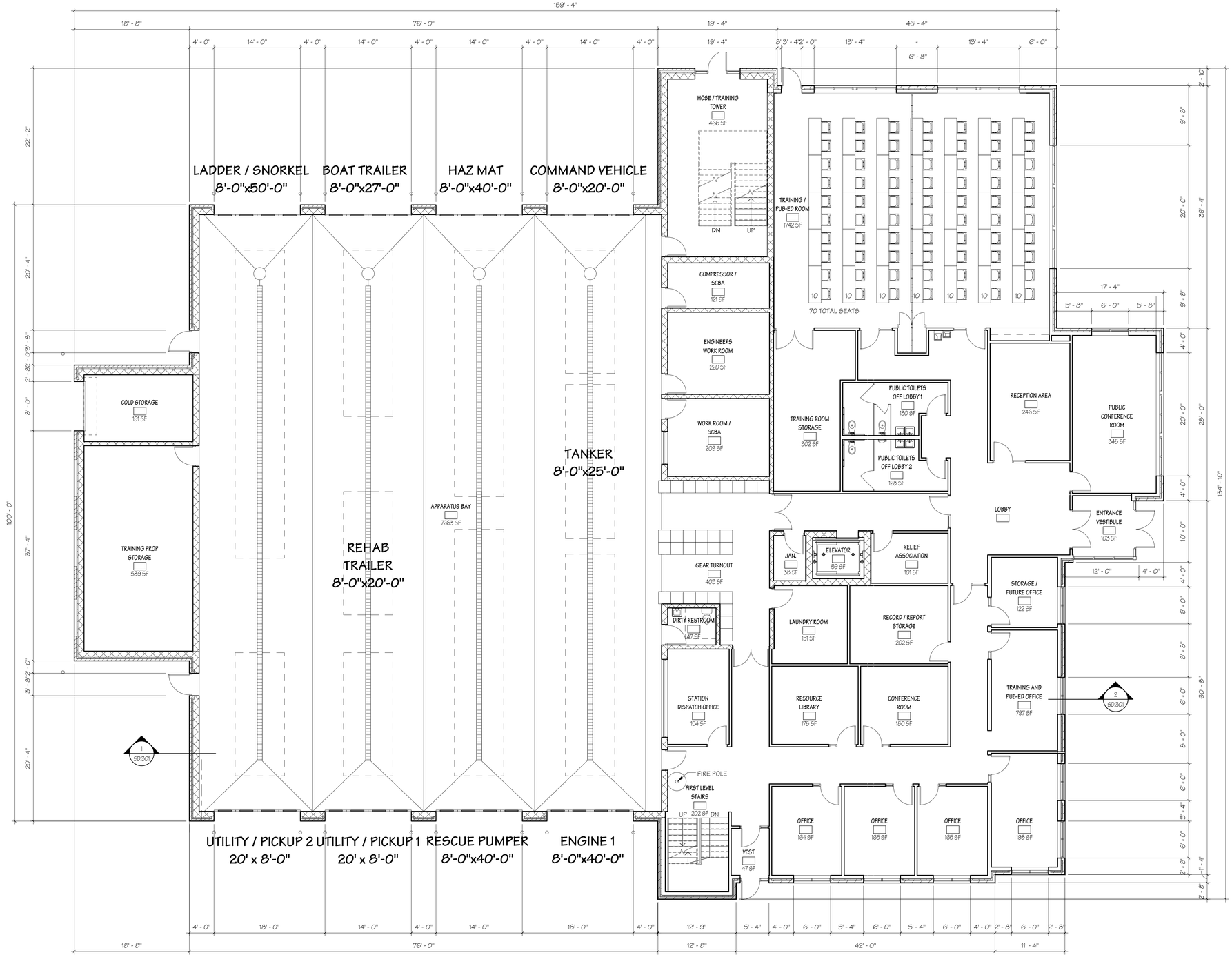

BUILDING SQUARE FOOTAGE	
FIRST FLOOR ADMINISTRATION	= 9,125 SF
APPARATUS BAY	= 8,500 SF
SECOND LEVEL	= 6,000 SF
TOTAL	= 23,625 SF

BASEMENT	= 4,000 SF

1 FIRST LEVEL - OPTION A

1/8" = 1'-0"

NORTH

INVER GROVE HEIGHTS FIRE DEPARTMENT

SD.1-01.05.2015

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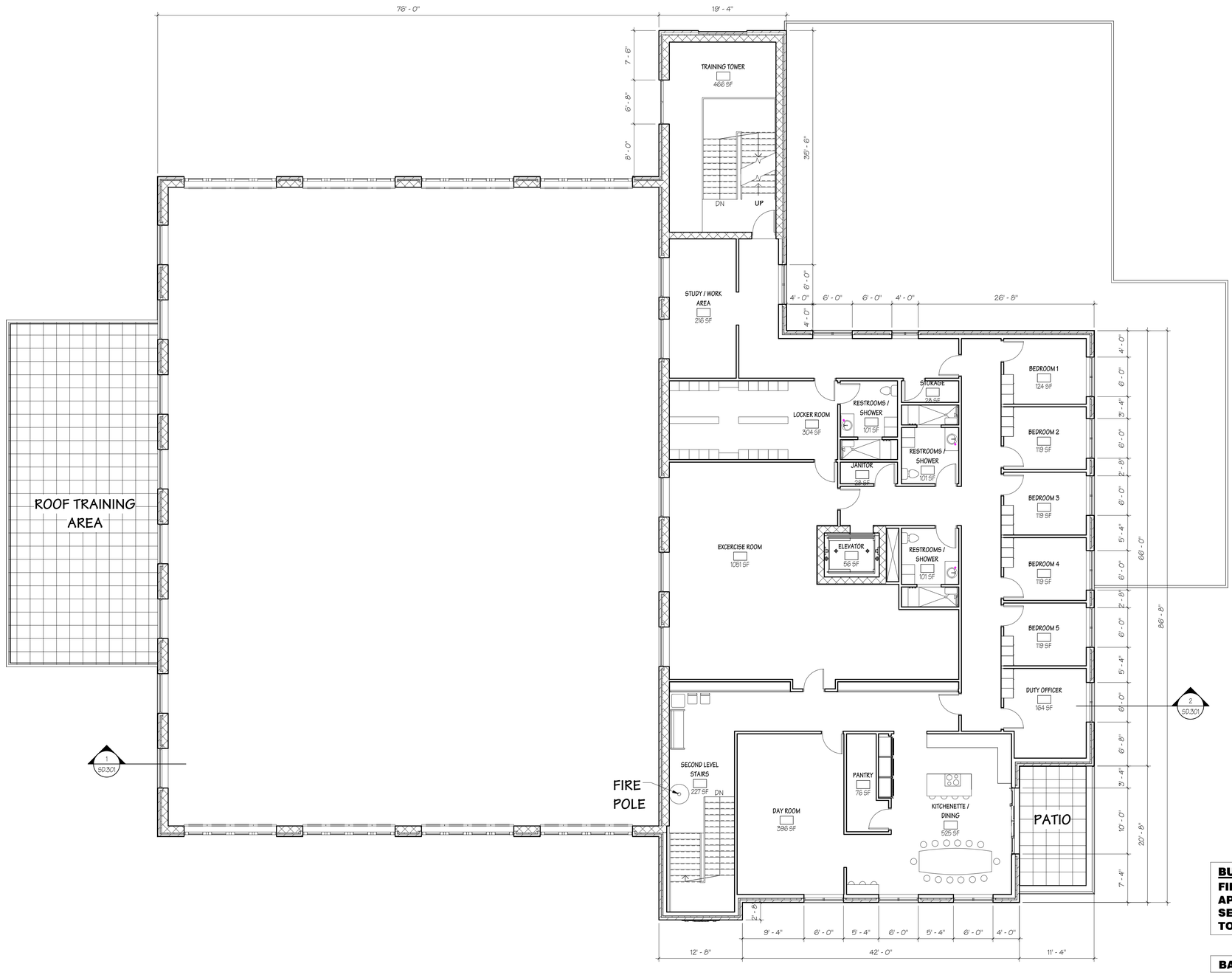

BUILDING SQUARE FOOTAGE	
FIRST FLOOR ADMINISTRATION	= 9,125 SF
APPARATUS BAY	= 8,500 SF
SECOND LEVEL	= 6,000 SF
TOTAL	= 23,625 SF

BASEMENT	= 4,000 SF

1 SECOND LEVEL - OPTION A

1/8" = 1'-0"

NORTH

INVER GROVE HEIGHTS FIRE DEPARTMENT

SD.1-01.05.2015

INVER GROVE HEIGHTS, MN

FIVE BUGLES DESIGN

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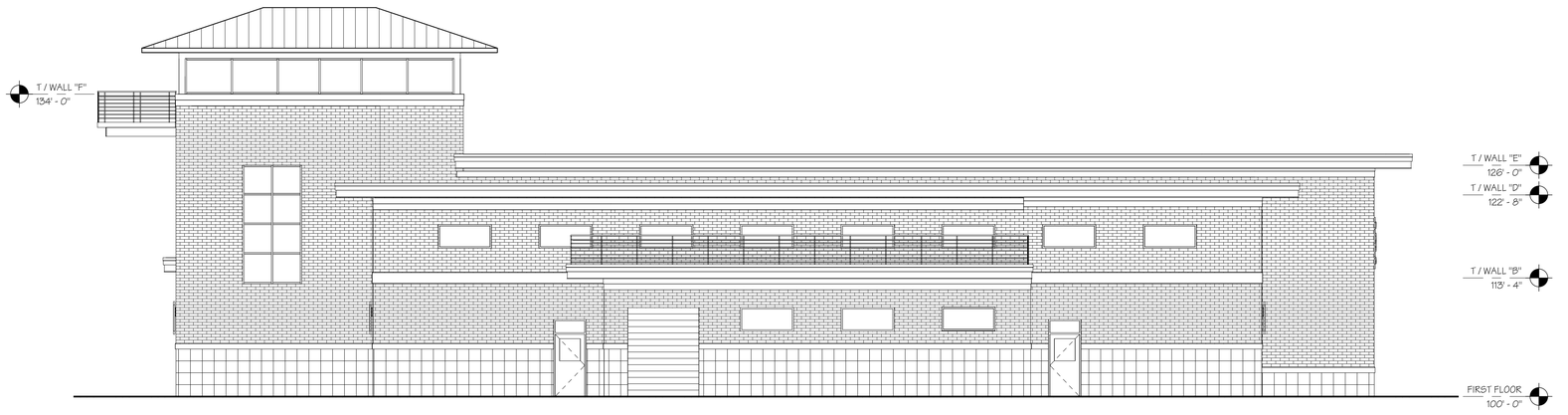
1 NORTH

1/8" = 1'-0"



2 SOUTH

1/8" = 1'-0"

INVER GROVE HEIGHTS FIRE DEPARTMENT

SD.1-01.05.2015

INVER GROVE HEIGHTS, MN

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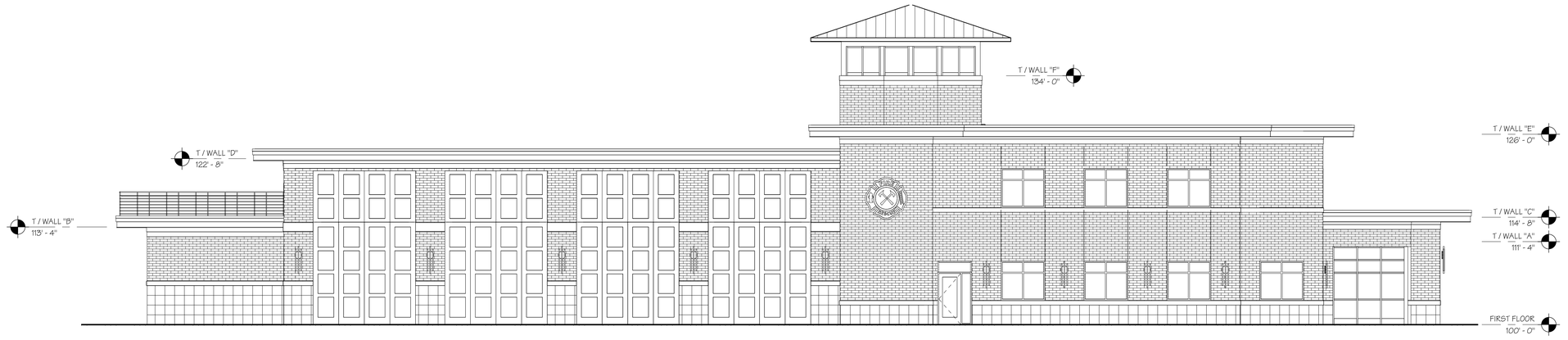
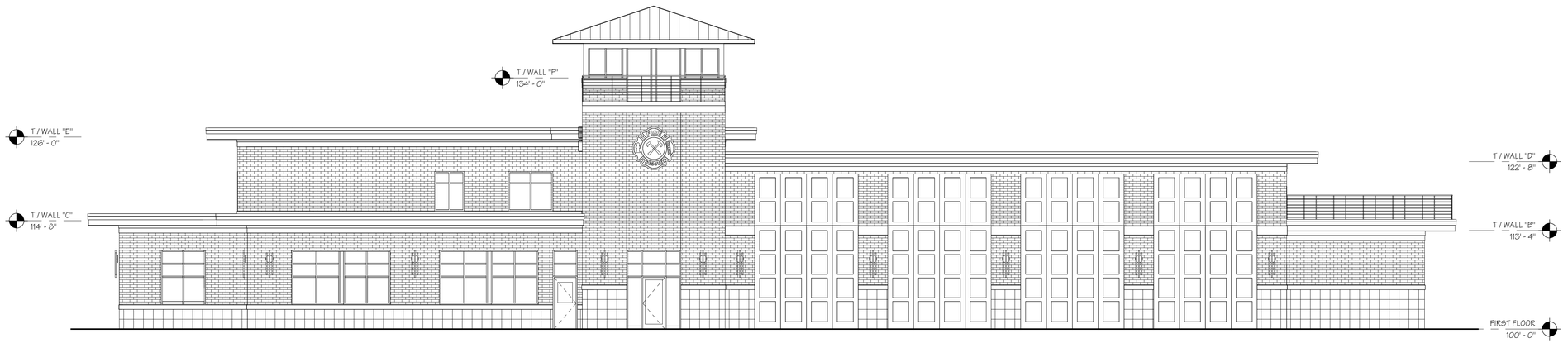


1 EAST
1/8" = 1'-0"



2 WEST
1/8" = 1'-0"

INVER GROVE HEIGHTS FIRE DEPARTMENT

SD.1-01.05.2015

INVER GROVE HEIGHTS, MN

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SD.1-01.05.2015

INVER GROVE HEIGHTS, MN

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INVER GROVE HEIGHTS FIRE DEPARTMENT

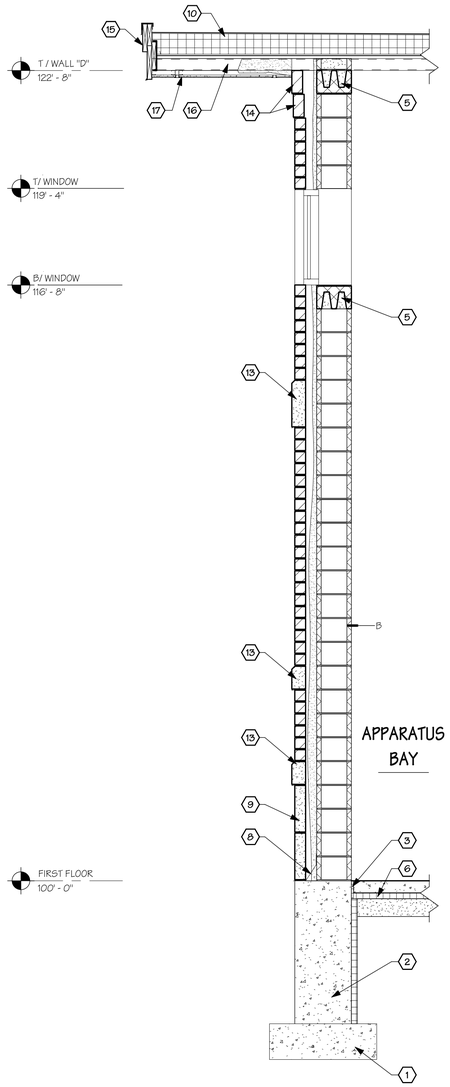
SD.1-01.05.2015

INVER GROVE HEIGHTS, MN

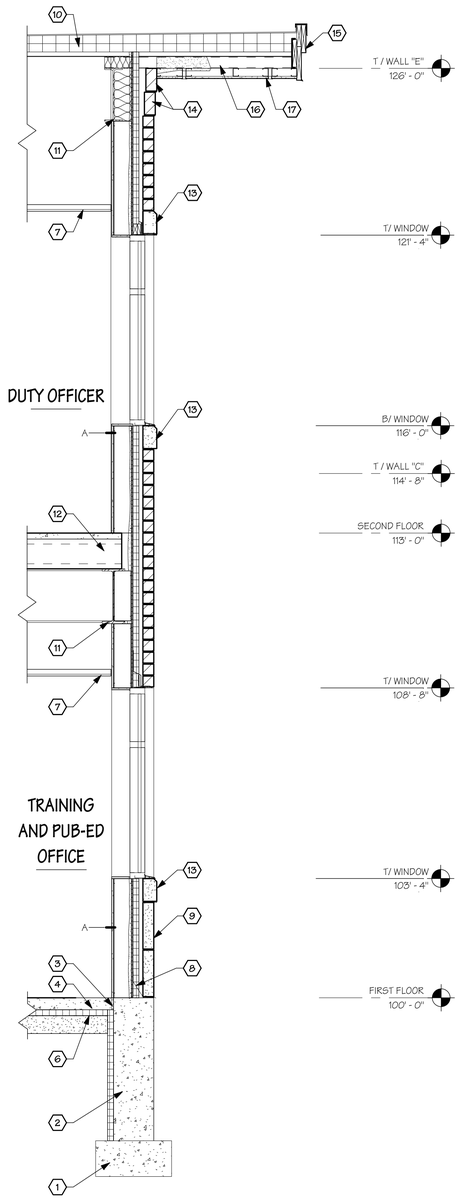
FIVE BUGLES DESIGN

PROJECT NUMBER: 14-056

PROPOSED TYPICAL CONSTRUCTION ASSEMBLIES FOR THE FIRE STATION



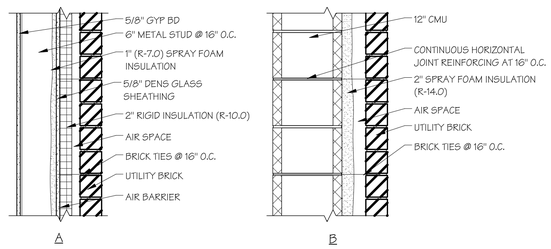
CONSTRUCTION AND FINISH ASSEMBLY
1 - WALL SECTION
1/2" = 1'-0"



CONSTRUCTION AND FINISH ASSEMBLY
2 - WALL SECTION
1/2" = 1'-0"

CONSTRUCTION NOTES

1 CONCRETE FOOTING
2 POURED CONCRETE FOUNDATION WALL WITH 2" (R-10) RIGID PERIMETER INSULATION
3 FIBROUS EXPANSION JOINT MATERIAL
4 4" CONCRETE SLAB OVER 10 MIL VAPOR BARRIER OVER 6" COMPACTED SAND
5 CMU BOND BEAM
6 PROVIDE 2" (R-10) RIGID INSULATION FOR IN-FLOOR HEAT SYSTEM UNDER CONCRETE SLAB
7 ACOUSTIC CEILING TILE
8 THRU WALL FLASHING w/WEEPS @ 2'-8" O.C. PROVIDE CAVITY DRAINAGE MATERIAL
9 CAST STONE , REFER TO ELEVATIONS FOR SIZES AND LOCATIONS
10 FULLY-ADHERED ROOF MEMBRANE OVER SLOPED RIGID INSULATION OVER METAL DECK
11 STRUCTURAL BEAM
12 2" CONCRETE TOPPING OVER 10" PERCAST CONCRETE PLANK, GROUT EXPOSED CORES SOLID
13 CAST STONE BAND, REFER TO ELEVATIONS FOR SIZES AND LOCATIONS
14 4" FACE BRICK w/ BRICK TIES @ 1'-4" O.C. OFFSET EACH BRICK 1/2"
15 PREFINISHED METAL FASCIA TRIM OVER STEPPED 2 X FASCIA OVER 2X WOOD SUBFASCIA
16 STRUCTURAL TUBE STEEL OUTRIGGER
17 EIFS FINISH OVER 5/8" GYP SHEATHING OVER 1 1/2" METAL FRAMING @ 1'-4" O.C. AT OUTRIGGER LOCATIONS



3 WALL TYPES
1" = 1'-0"

INVER GROVE HEIGHTS FIRE DEPARTMENT

SD.1-01.28.2015
INVER GROVE HEIGHTS, MN

FIVE BUGLES DESIGN
PROJECT NUMBER: 14-056

MEP SYSTEMS NARRATIVE

Client: ADG
Project Name: Inver Grove Heights Fire Station
MEP Project Number: A11.14.21

SYSTEM TYPE (HVAC, PLUMBING, ELECTRICAL, ETC.)

Fire Protection System Description:

- The building will be provided with a water based sprinkler system. Piping will be Schedule 10 steel mains with Schedule 40 steel branch lines and concealed sprinkler heads in the office and dorm area.
- Due to the lack of city utilities in the area a below grade water storage tank is required to provide a one hour duration of water for the sprinkler system.
- A vertical turbine fire pump with pump house will be required to provide the proper water pressure and flow to serve the sprinkler system. PLEASE NOTE: this report will provide costs for a new facility with and without municipal utilities. The cost of the below grade tank and pump/pump house will not be included in our estimate of a facility with municipal utilities

Plumbing System Description:

- Due to the lack of city utilities in the area the domestic water supply will be provided by an onsite well. The pump shall have variable frequency drive and sized for 125 gpm at 45 psi for filling apparatus.
- The 3" line is sized to provide the domestic needs for the station plus two fill outlets in the Apparatus Bay.
- Plumbing fixtures will be equal to Kohler china and Elkay stainless steel sinks. Water closets will be floor mounted with flush valves. Showers will be tile. Apparatus Bay will require a heavy duty trench drains with catch basins.
- A small grease interceptor will be required for the kitchen.
- Water heating will be provided with a high efficiency natural gas stainless steel tank water heater. 140°F water is required for the kitchen. The hot water will be softened. The hot water system will also require a hot water circulating system.
- Roof drains with internal piping will be used to convey storm piping from the building roof.
- RO water will be used to cleaning vehicles. A small RO system will be located in the basement mechanical room.
- Provide a compressed air system with outlets located throughout the Apparatus Bay. The compressor will be located in the basesment mechanical room.
- Materials: Copper water mains and branches, PVC sanitary and storm piping (above and below grade), CPVC RO system piping, and copper pipe and fittings for the compressed air system.

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- Due to the lack of city utilities in the area an onsite sanitary septic system is required serve the entire building. An additional hazardous waste holding tank will be required for waste not permitted to drain through the septic system.

HVAC Systems Description:

- Heating System:
  - The baseline heating system will be provided by natural gas high efficiency condensing hot water boilers. Hot water will be distributed to terminal units with a two pipe supply/return system. The pumping arrangement will consist of a primary/secondary system.
- Cooling System:
  - The baseline cooling system will be provided by air cooled chiller. Chilled water will be distribution to terminal units. Chilled water will be distributed to terminal units with a two pipe supply/return system. The pumping arrangement will consist of a primary/secondary system.
- Optional Geothermal System
  - MEP will study the feasibly to provide geo-thermal heating and cooling system. In lieu of hot water boilers and an air cooled chiller, water-to-water heat pump chillers will serve as the primary heating and cooling plant for the office/dorm area. The apparatus heating will be supplemented with a hot water condensing boiler. Further analysis of the site is required to determine the geo-thermal field and associated costs.
- Office/Dorm Area HVAC System:
  - Fan coil units with hot water and chilled water coils will serve as the heating and cooling terminal units. Each fan coil will have four pipe connections; hot water supply/return and chilled water supply/return. Supply and return ductwork will be provided throughout and sized to accommodate heating, cooling and ventilation requirements.
  - Ventilation and general exhaust will be provided via an energy recover ventilator (ERV) located in the mechanical room. Ventilation air from the ERV will be ducted to each fan coil unit.
  - A 4’ strip of radiant in-floor heat will be provided along the perimeter of the first floor area.
  - Make-up air for the kitchen will consist of a small natural gas fire make-up air unit.
- Apparatus Bay Area HVAC System:
  - Radiant in-floor heating will provide the primary heating source. Hot water will be provided by the same boiler serving the office area. Additional hot water unit heaters will be provided for supplemental heat. The ventilation

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system will consist of a natural gas direct fired make-up air unit. The make-up air unit will be controlled an automatic CO/NO2 exhaust detection system. Inline exhaust fans located in the space and ducted to louvers in sidewalls. The proposed system will provide 1.0 cfm/sq of floor area exhausted from the area. The area will not be cooled, destratification fans will be provided to move air during cooling periods.
    - Vehicle exhaust system is not included in the base bid design. There are several versions of systems available. Typically, they are purchased through the FFE (fixtures, furniture and equipment) budget.
- Controls:
    - Digital direct controls (DDC) will be provided to operate the HVAC system.

Electrical Systems Description:

- Normal Power:
    - The new fire station will be served from a 208/120V 3-phase, 4-wire electrical service, with approximately 1000 Amps of capacity. The main distribution panel shall include circuit breaker overcurrent protection, a digital power meter and a surge protection device. The distribution layout within the building shall consist of a main distribution panel in the electrical room and branch circuit panels mounted remotely throughout the building. Remote panelboards shall be mounted within storage rooms or other utilitarian type spaces. Common panelboards shall be provided for general power and lighting circuits, and dedicated panelboards for mechanical equipment.
- Emergency Power:
    - The new fire station shall be equipped with an exterior diesel generator set installed in a sound attenuated, skin tight enclosure, critical grade silencer, and belly tank. The generator set shall serve both emergency loads (NEC Article 700) such as fire alarm, emergency lighting, elevator, alerting system, etc., as well as legally required loads (NEC Article 701) serving fire safety and building HVAC equipment. Transfer switches serving the emergency and equipment loads shall be closed transition type.
- Interior Lighting:
    - A combination of fluorescent and LED lighting will be provided throughout the new fire station. Fluorescent fixtures shall be of the 2'x2', 2'x4' volumetric variety, as well as acrylic lay-in troffers, chain mount 4ft open and enclosed industrials, and 6-lamp high bay fluorescents in the apparatus bays. In addition to these fixture types, LED down lights and decorative pendants shall also be used.

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    - Lighting control throughout the building shall consist of wall and ceiling mounted occupancy sensors in offices, conference rooms, training rooms etc., day light sensors in open areas with an abundant amount of natural day lighting, and low voltage lighting control panel(s) for use in open areas such as day room, corridors, and apparatus bays.
    - Lighting control panels shall also serve the exterior lighting with an input from an exterior photo-cell and integral time clock. Control panel shall also have the ability receive an input signal from the fire alarm alerting system for turning on specific lighting relays.
- Exterior Lighting:
    - All new exterior pole mounted site lighting and building façade lighting will be LED type.
- Voice / Data / Security Systems / Cable TV:
    - All systems and wiring shall be provided by the Owner under separate contract. This project will provide rough-ins only. The rough-in requirements will need to be coordinated with the Owner.
- Fire Alarm System:
    - The new fire alarm system shall be an addressable system with ceiling mounted notification devices. Since the building will be fully sprinklered, the fire alarm system's automatic detection will be minimal, and primarily serving the elevator recall functions only. Manual pull stations shall also be provided at the exterior doors leading out of the building. Notification devices shall be horn and strobe type. The fire alarm system shall consist of a fire alarm control panel within the main IT room, annunciator panel in a location determined by owner, and notification extender panels as required.
- Focus On Energy:
    - Coordination with FOE shall be by the Owner. The lighting design will be compliant with FOE requirements and will provide the opportunity for rebates.

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Design and Construction Schedule

January 2015	Completion of Feasibility and Programming Study
February/March 2015	Site utility issues; extend utilities under Hwy 52
February 2015	Issue Architect and Construction Manager RFPs
March 2015	Architect/Construction Manager Selection
April 2015	Complete Schematic Design
May 2015	Complete Design Development
July 2015	Complete Construction Documents
August 2015	Bid Project
September 2015	Start Construction
September 2016	Fire Station Completion
August 2017	Eleven month warranty walk-through

Opinion of Probable Cost

ADG/Five Bugles Design is pleased to provide this report on Opinion of Probable Cost. The estimates included in this report are based on summer and fall 2014 comparable bid results. We would caution that the current bid climate is extremely volatile following several years of consistency (recession), and probable costs as well as the availability of labor need to be monitored closely.

Within the text of the report we have provided anticipated construction materials and building systems for the selected 23,500 sq. ft. Schematic Design with basement. For building construction as shown with partial basement our projected cost:

	$5,520,000
Initial site work based on a finish floor elevation of 955 sq. ft:	$ 117,000
Construction Cost Base Budget:	**$5,637,600**

Please note that our projected cost estimate is based on the promise of the City extending utilities under a four lane highway, and bringing utilities to the building site. Our projected cost does not include the cost of the utility extensions.

The City may opt to not extend utilities and rely on a well and holding tank for the fire suppression system. Under this scenario, the cost estimate should be increased $350,000. We recommend the City of Inver Grove Heights makes this decision prior to issuing a RFP for Architect/Construction Manager services. Estimated cost with septic/well and fire suppression holding tank: **$5,987,600**

As a possible design option, Inver Grove Heights has requested a cost estimate for providing a full basement at 9,125 sq. ft. in lieu of a partial basement. This option would also include extension of paving and vehicular access to the basement. In such a scenario, it is probable the finish floor elevation would be adjusted to 960 sq. ft. allowing for favorable grading and drainage.

Additional Site Work:	$291,400
Additional Basement square footage:	$461,250
	$752,650

FF & E and Soft Cost Budget

Fixtures, Furniture and Equipment are outside the scope of this study but should be considered in budgeting discussions. FF & E budgets can typically range from 10 to 20 percent of the project construction costs and include telecommunications, IT, alarm systems, vehicle exhaust systems, furniture, turn out gear lockers, kitchen and laundry appliances, etc. Soft costs typically include A/E fees, site survey, material testing, and plan approval fees.

FE&E Budget Range: **$674,000 to $1,350,000**

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