# M S B
## DOROTHY SWANDA JONES
ADMINISTRATION BUILDING

## No. 350
EAST DAHLIA

SCHEMATIC DESIGN NARRATIVE

WOLF ARCHITECTURE, INC.

29.09.2011

# ADDITION AND UPGRADES

To the Matanuska Susitna Borough's
Dorothy Swanda Jones Administrative Building at
350 East Dahlia Street, Palmer, Alaska

## PROJECT SUMMARY

This project consists of the design and construction of a two story addition situated within the east courtyard of the existing building increasing the area of the building by approximately 18,280 square feet.
Addition Main Level 10,340 s.f.
Addition Upper Level 7,940 s.f.

The main level of the plan is designed to improve the public process and public interface with the local government; the second level provides additional office space to improve efficiency, provide security, and allow for the flex space and infrastructure upgrades necessary to upgrade and renovate the existing facility.

The design conforms to the $6.7 million dollar budgetary parameter established by the MSB Assembly which includes new assembly chambers and enhanced communication interfaces for public participation including remote access, internet, and satellite communication systems.

The new building is structurally independent of the existing facility and will be designed and constructed to the current edition of all applicable model building codes.

## ARCHITECTURAL DESIGN CRITERIA

### Historic Information

The existing Dorothy Swanda Jones Administration building is a two story wood frame structure constructed in approximately 1935 as the Central School for Palmer. The structure has a poured-in-place concrete basement which is in good condition and likely constructed as a means to extend the footing through the native silt to native gravel. The building was decommissioned as a school in 1977 and adaptively reused as the Borough office building. A renovation was completed on the facility in 1985 which added approximately 9,000 s.f. of area to the original building and upgraded the mechanical and electrical system.

Figure 1: existing building

During the past 25 years the population base of MSB has tripled in size; the number of staff housed in the facility has increased proportionately. The goal of this project is to increase the space available for MSB staff and addresses the following goals:

1. Reduce barriers to access for disabled individuals.
2. Create a larger assembly chamber for public forums to reflect and accommodate the increased population of the Matanuska Susitna Borough.
3. Provide adequate work and meeting space to consolidate and house the entire MSB Assembly and Administrative department.
4. Develop a building wide departmental organization strategy to facilitate interface with the public.

5. Evaluate and develop a strategy to upgrade the existing mechanical, electrical, and technology infrastructure within the entire facility.
6. Create flex space within the existing building to allow the entire existing facility to be renovated as a multi-phased project over a number of years.
7. Maintain historic character of the existing structure.

The proposed addition limits the construction within the existing facility to removal of existing siding and windows within the area bounded by the courtyard and approximately 3,000 s.f. of interior renovation within the existing building. The proposed addition will increase the size of the existing first level by an additional 10,400 s.f. and the second floor by another 7,960 s.f.

## ACHIEVING PROJECT GOALS

1. **Reduce barriers to access for disabled individuals.**
   a. The new addition greatly improves accessibility within the MSB DSJ facility through the consolidation of public interface points within the facility and the relocation of the assembly chambers to the main level. Additionally, a new ramp allows for easy access to the existing floor level, and the new audio visual system will allow individuals greater access through technological improvements integrated into the facility.
   b. The proposed addition allows the existing IT department greater accessibility and connectivity to the main building. A second set of stairs and ramps allow upper level of the IT department to be fully accessible and, if desired, opens the possibility to incorporate a new elevator to make the lower level of the IT department fully accessible.
2. **Create a larger assembly chamber for public forums to reflect and accommodate the increased population of the Matanuska Susitna Borough.**
   a. The proposed new on-grade, state of the art, 300 person assembly space is sized to accommodate large meetings when they occur. The assembly hall will be outfitted with new large flat screen monitors and sound system to allow greater public participation by people who are present on-site and those who choose to participate with remote access capabilities.

b. The new assembly space has been designed with security in mind providing assembly members semi private access to the chambers and multiple points of egress in an emergency situation.

c. The new Assembly Room is designed with flexibility in mind incorporating three operable acoustical panels into the room allowing for smaller public meetings or up to three large classroom or conference rooms for everyday use and maintaining a secured assembly podium.

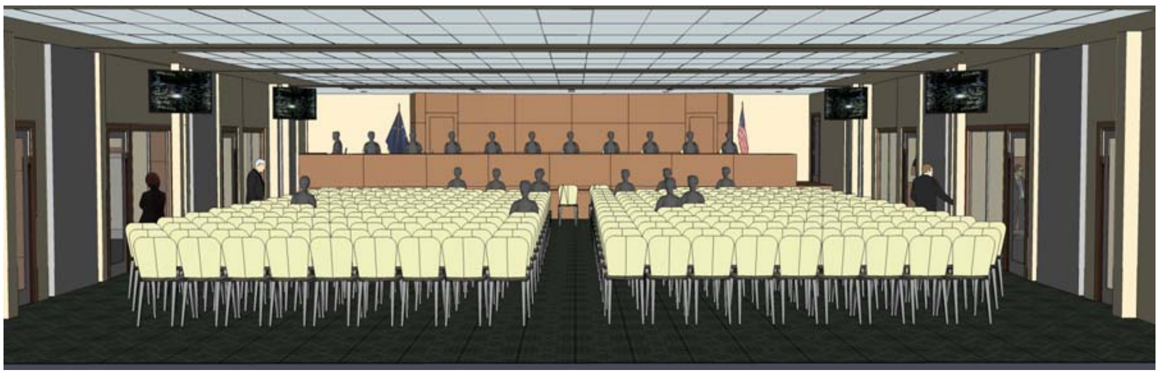

Figure 2: assembly chamber from the east

3. **Provide adequate work and meeting space to consolidate and house the entire MSB Assembly and Administrative department.**

    a. The proposed design has been expanded from the originally conceived 16,000 sq. ft. addition to approximately 18,000 s.f. and provides connectivity and accessibility to the existing IT department.

    b. Seven new private assembly offices have been incorporated into the design providing the elected officials a place to meet with constituents, store sensitive materials, and a private place to conduct the business of the people.

    c. New office space has been provided for the Attorney's Suite, Clerk's Office, Human Resources, and the Administration addressing the following needs:

        i. Increased privacy for sensitive issues

        ii. Private and secure conference space for private meetings and functions such as depositions which currently occur in rented off-site locations.

iii. Provide adequate work area for staff

iv. Includes adequate and secure storage for Human Resources and the Clerk's office

v. Larger Attorney offices allowing private in-office meetings

vi. Provide separate, enclosed work rooms for printing and layout.

4. **Develop a building-wide departmental organization strategy to facilitate interface with the public**

   a. The proposed design consolidates and integrates the "point of contact" for each department within the core of the new addition, allowing easy interface for visitors to any department within the Borough Building.

Figure 3: View of lobby, information desk and entrance to assembly chambers

5. **Evaluate and develop a strategy to upgrade the existing mechanical, electrical, and technology infrastructure within the entire facility.**

   a. The existing mechanical and electrical systems have been evaluated and strategies have been included in the design to upgrade the heating, air conditioning, ventilation, electrical, and communication system within the building.

      i. Refer to the mechanical and electrical narratives included within this document for detailed commentary on the existing facility and planned upgrades.

   b. The project provides for upgrades to the systems noted above capable of expanding into, and upgrading the existing facility over a number of planned and phased separate projects.

i. As an example, three (3) new large capacity mechanical units have been included within the design budget which will be ducted into the existing facility to upgrade the mechanical system as part of future tenant improvement projects.

6. **Create "flex space" within the existing building to allow the entire existing facility to be renovated as a multi-phased project over a number of years.**

   a. The proposed design frees up approximately 2,500 s.f of area within the existing building and will allow departments to more easily shift locations within the existing facility during future renovations. Currently this flexibility does not exist within the facility complicating any renovation planning.

7. **Maintain historic character of the existing structure.**

   a. The proposed design maintains the historical character of the existing facility mimicking the 1930's architectural genre and making use of the same windows, wood siding and hipped roof aesthetic.

   b. The new rooftop mechanical units are concealed behind the new Mansard style roof maintaining the appearance of the traditional hipped roof of the existing structure.

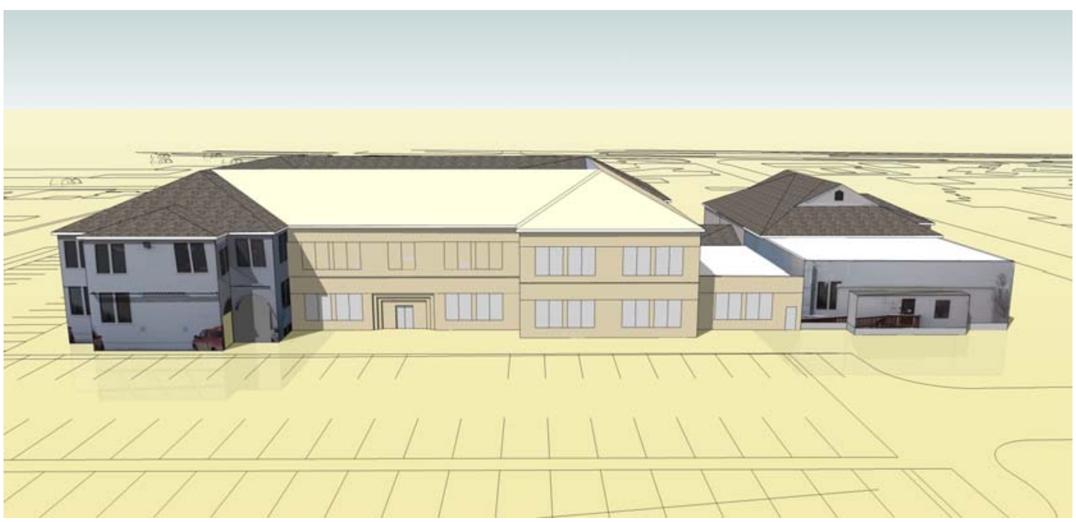

Figure 4: schematic of new façade from the east

8. **Conform to prescribed budget.**

   a. This design has been carefully and thoughtfully developed with the assistance of the MSB Building Advisory Committee. The solution incorporates the amenities listed above and does so conforming to the $6.7 million dollar budget. See attached cost estimate.

## CONSTRUCTION ASSEMBLIES

**Typical Foundation and Floor systems**

- See structural narrative for structure

**Typical Exterior Wall Assembly**

- ¾" Painted wood siding to match existing (Salvage Existing where possible)
- Air Infiltration Barrier
- Structural Sheathing
- Structural Insulated Panel
- 6" Wood Studs at 24" o.c.
- R-21 Blow In Batt Insulation
- 6 mil Vapor Barrier
- 5/8" GWB

**Typical Floor/Ceiling Assembly**

- Suspended Acoustical Tile Ceiling Assembly
- 30"-40" interstitial air space for Ducts, Lights, and Sprinkler Piping
- Steel Structure as described in structural narrative
- Steel Decking
- 4" Concrete Slab
- Flooring Material
  1. Modular Carpeting at Offices, Public Areas, and Conference Rooms
  2. Sheet Vinyl at Kitchenettes and Toilet Rooms.

**Typical "Flat" Roof Assembly**

- Steel roof structure

- Steel roof deck
- 4" Concrete Slab
- 8" Polyisocyanurate Insulation
- Tapered EPS Insulation
- ½ OSB
- Mechanically Fastened 60 Mil TPO Roof

**Typical "Sloped" Roof Assembly**

- Steel roof structure
- Steel roof deck
- 4" Concrete Slab
- 8" Polyisocyanurate Insulation
- Tapered EPS Insulation
- Wood Truss at 24" o.c.
- 5/8" Roof Sheathing
- 30 lb Roof Felt
- 3 tab Asphalt Shingles to match existing

**Typical Interior Wall Assembly**

- 5/8" GWB Each Side
- Metal studs @ 16" o.c.
- R-13 acoustical Batt Insulation at toilet rooms, Conference Rooms and Offices

**Typical Sound Isolation Interior Wall Assembly**

- 5/8" GWB Each Side
- Rubber Isolation Pads @ 24" o.c. Vert & Horizontally
- Metal studs @ 16" o.c.
- R-21 acoustical Batt Insulation

**Typical Operable Partition**

- Similar to Modernfold 932FS

**Typical Finishes**

- **Floors**
    1. Modular Carpet ($6.00 sf installed)
        - Assembly/Conference
        - Office
        - Hallways/Public Areas
    2. Sheet Vinyl ($5.00 s.f. installed)

        - Toilet Rooms
        - Kitchenettes
        - Utility Rooms
        - Storage Rooms
  - Walls
    1. Paint on GWB
    2. 4" Rubber wall base
  - Ceilings
    1. Suspended Acoustical Ceiling Tile System
    2. Misc. GWB soffiting throughout – Painted

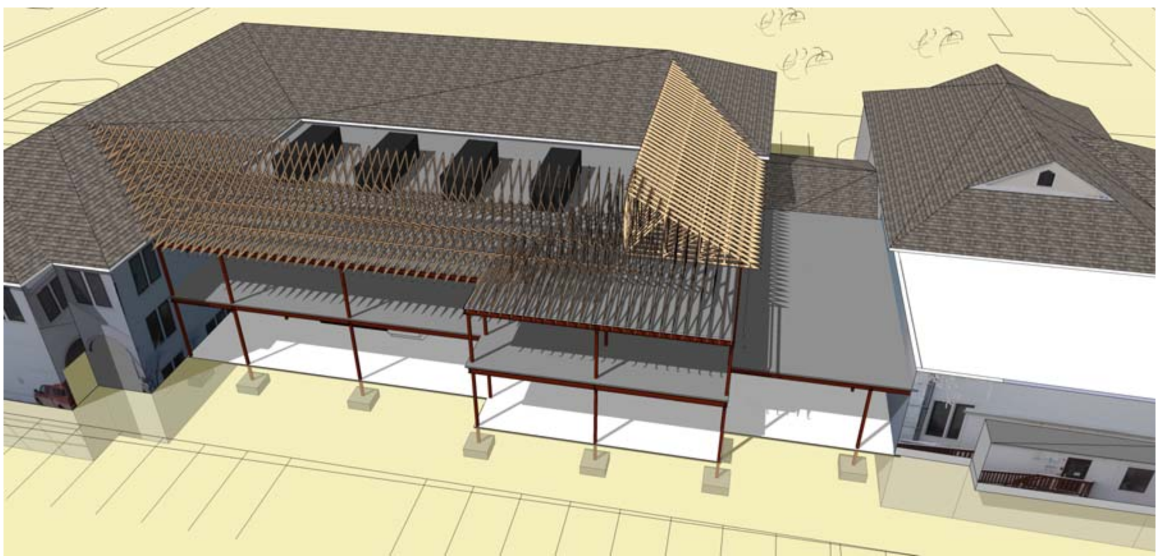

Figure 5: wooden roof trusses and mechanical units

## Acoustic Considerations

### Flooring

The floor of the assembly space will consist of a concrete slab on grade covered with commercial grade modular carpet tiles which will absorb bounced sound waves and are a critical part of the acoustical strategy for the space.

### Vertical Surfaces

Wall assemblies are envisioned to be a combination of painted gypsum board, glass and acoustical wall panels. The exact configuration of the materials will be adjusted based on the input of the Acoustical Engineer.

### Ceiling System

The ceiling system in the assembly space will be a combination of suspended acoustical ceiling tile assemblies and lowered gypsum soffits. The painted gwb soffits are necessary on each side of the assembly hall to accommodate ductwork as well as partitioning the space as necessary to support the operable partition track assembly.

### Mechanical system sound attenuation measures

Duct work will be lined with sound absorbing materials and configured to minimize sound. Refer to the mechanical narrative for addition strategies related to sound mitigation.

### Audio Visual / Sound System

The Assembly space has been design to take advantage of state-of-the art sound systems and audio/visual conferencing equipment such as flat screen monitors, video and satellite conferencing capabilities and will include new wall or ceiling mounted flat screen video monitors within the assembly hall and in the lobby areas located at each side of the assembly space. Lights in the assembly space will have the capability of being dimmed.

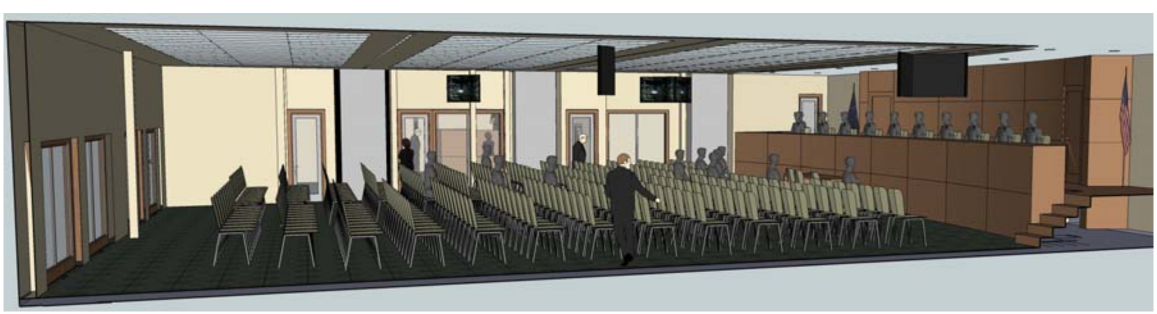

Figure 6: assembly chambers from the north

The proposed assembly space is envisioned to accommodate state-of-the art communications systems with the capability of allowing satellite feeds and internet video conferencing.

The new sound system incorporated into the assembly space will be hard wired for reliability and will be connected to assembly stations, staff stations and at the public comment podium. The speaker system will be designed by an acoustical engineering and sound system engineer and will be ceiling mounted throughout the assembly hall to ensure even sound distribution.

### Sustainability

It is important this building be designed as thoughtfully as possible taking into consideration the people who work and visit the facility. In addition the facility is required to function as efficiently as possible which will include specifying and installing the appropriate equipment and materials which conserve energy and provide the environmental quality of the building. The design will take into consideration many of the sustainability features delineated in the USGBC Leadership in Energy and Environmental Design (LEED) program but we are not intending to pursue certification through the Green Building Council.

### Environmental Hazards

The new addition will be constructed within the existing east courtyard and requires interface with the existing roof, exterior walls, and soils in and around the courtyard. White Environmental has performed environmental hazards analysis on the interior of the existing building as a separate project and was engaged to sample exterior materials to verify the existence of environmental hazards in exterior paint, sealants, mastics, and asphalt shingles. The results of the sampling is attached to this document but confirms there are no environmental hazards present in the exterior building materials of the MSB DSJ building. Soils sampling at the underground tank was not performed since obtaining samples below grade ran the risk of damaging unknown utility lines which seemed a greater risk than the likelihood the existing double wall tank contained a leak.

# CIVIL NARRATIVE

PND conducted an underground utilities investigation at the Matanuska Susitna Borough's (MSB) Dorothy Swanda Jones Building. The site is located at 350 E. Dahlia Avenue in Palmer, Alaska. The utility investigation was limited to the courtyard on the east side of the facility, the location of the proposed addition. The Owner provided PND with a sketch illustrating approximate locations of underground utilities. The information is based on as-built conditions of various utilities encountered during a separate project to install/replace foundation drains adjacent to the building. Utilities identified include storm sewer, sanitary sewer, underground electric and telecommunications. In an effort to expand on the information obtained by Mat Su Borough personnel, PND contracted two utility locate technicians to determine the location of buried utilities:

- One Stop Services – provided locates for storm and sanitary sewer lines.
- Rock Ridge Services – provided locates for electrical and telecommunications lines.
- Alaska Dig line - provided locates for mains and utility owned lines.

Storm sewer was traced with a camera and transmitter placed into the pipe via manholes and cleanouts. The storm sewer appears to carry the runoff from the foundation drain east to the storm drain catch basin. Runoff is then directed south, towards a clean-out/storm inlet-type structure. The pipe then runs beneath the southern portion of the DSJ building towards Elmwood Avenue. A storm system collecting water in the parking lot to the east also tied in with the aforementioned system beneath the building. The depth of these pipes varied from 4 to 6 feet below ground surface.

The underground electric was traced using a frequency transmitter placed on exposed conduits. The locate technician traced the lines after the transformer, which is typically the point of demarcation. Two lines crossed the courtyard area running from the transformer in the northern fenced mechanical yard to the HVAC units in the southern fenced mechanical yard. It appears that one line feeds the eastern unit and the other feeds the western unit. Based on the MSB sketch the electrical lines are identified as three phase power lines which along with one additional power line serving site lighting comprise the electrical services located in the courtyard. These lines are buried at depths ranging from 1.1 to 2.5 feet below ground surface. The telecommunications line and sewer line identified in the provided sketch were not found in the investigation and no access points (cleanout, manhole, foundation wall penetration) were identifiable for the sewer.

According to MSB personnel and the City of Palmer, the building sewer service is located on the west side of the facility and a cleanout was located on the west side of the facility which validates this information. The 8 inch sewer line identified on the MSB sketch encountered during the previous work may be abandoned in-place.
Investigation of several mechanical rooms and telecommunications switches revealed no foundation wall penetrations where the line might enter the building. IT personnel suggested the line may be a fiber optic connection from the IT department in the northern building wing through the courtyard to the southern building wing.

The locates provided by the Dig line showed the underground electric entering the site near the northeast corner and running south then west to the transformer. Communication lines also appeared to enter the northern mechanical yard on a similar alignment, although discussions with the utilities determined that these may be abandoned. No water or sewer mains were identified in the vicinity of the proposed addition by the Alaska Dig line locates technicians.

**Summary of Existing Utilities Located in Courtyard**

- Telecommunications lines – Lines to remain intact and be routed through the building in proposed crawlspace.
- Electrical Lines - Abandon electrical lines serving existing HVAC. Waste lines - Abandon existing sewer (assumed already abandoned)
- Storm drain – Remove existing storm catch basin and attach to existing storm drain line
- Parking: Based on the City of Palmer parking requirements an additional 125 parking spaces are required to support this new addition.
  300 Seats / 1 car for 4 seats = 75 spaces
  15,000 s.f. gross floor area / 300 s.f. per parking space = 50 spaces

The budget for this project does not allow for the expansion of the existing parking. The City of Palmer has extended the offer to provide the needed additional parking by constructing new parking areas to accommodate this project. The new parking areas would be located adjacent to the existing site and would comply with City of Palmer requirements.

Figure 7: existing site

### Utilities

City water, sewer is available off the Old Glenn Highway. We anticipate naturally occurring bedrock will interfere with the installation of water and sewer lines to the project site. Gas and Electricity are located on the site.

### Landscaping

The site is currently not landscaped. It is anticipated that a minimum of 6" topsoil will be required and distributed at planting areas. The city of Palmer requires minimum landscaping which has not been included as part of this proposal since the Palmer landscaping standards are currently in the process of revision. We anticipate the Academy Charter School will be able to install the landscaping components for this project.

### Structural Design Criteria Codes

The proposed construction will be designed to meet or exceed the requirements of the 2006 International Building Code (IBC) including the City of Palmer local amendments.

### Standards

The purposed construction will be designed in accordance with the following standards.
American Society of Civil Engineers (ASCE) Standard Minimum Design Loads for Buildings and other Structures
American Concrete Institute (ACI) Publications
American Institute of Steel Construction (AISC) Manual of Steel Construction
American Welding Society (AWS) Publications
American Society for Testing and Materials Standards
Steel Structures Painting Council Publications
Steel Deck Institute Publications

### Design Category

The building shall be classified as a Category III facility.

## LOCAL ENVIRONMENTAL DESIGN PARAMETERS

### Wind Loading

The building shall be designed for wind forces with a minimum basic wind speed (3-second gust) of 110 mph, exposure factor C.  Importance Factor shall be 1.0.

### Seismic Loading

The building shall be designed for seismic forces as determined by the IBC's equivalent static force procedure. Seismic parameters are as follows:

| | |
|---|---|
| Site Class | D |
| Importance Factor | 1.0 |
| $S_{DS}$ | 1.5 |
| $S_{D1}$ | 0.6 |
| Seismic Design Category | D |

Twenty percent of the roof snow load shall be included in the weight of the building for seismic computations per the IBC.

### Roof Loading

The building shall be designed for a ground snow load of 57 psf. The Importance Factor for snow shall be 1.0. Minimum flat roof snow load shall be 45 psf.

### Floor Loading

The minimum floor live loading will be as specified in the IBC and the ANSI /ASCE 7-05 (Minimum Design Loads for Buildings and Other Structures).

| | |
|---|---|
| Slabs on Grade | 125 psf |
| Lobbies and entrances | 100 psf |
| Corridors | 100 psf |
| Offices | 100 psf |
| Partition Load | 20 psf |
| Mechanical Rooms | 125 psf or weight of equipment |
| | |

## STRUCTURAL FRAMING SYSTEM

### General

The building addition shall be a seismically isolated, stand-alone, two-story structure that will abut to the existing wood framed Borough offices. Floor elevations will match those of the existing structure. There will be no basement in the addition. The roof will be a low-slope roof with space for mechanical equipment and will support a mansard of pitched wood trusses that will match the slope and tie into the existing roof of the existing building.

### Gravity-Resisting Elements

Rooftop snow and the weight of mechanical and roofing materials shall be supported by steel deck. Deck will be welded to steel roof framing which consists of hot-rolled wide flange beams and girders, which in turn are bolted to structural steel columns.

Second floor loads are supported by steel wide-flange beams and columns. Composite steel deck will be overlaid with concrete topping for a total thickness of four inches to provide stiffness and reduce vibration and sound transmission. Floors will be designed for loads higher than the normal 50 psf office loading to accommodate heavy file cabinets.

### Lateral Force-Resisting Elements

Wind pressures will be exerted on the exterior curtain walls, and will be transferred to the roof and second floor levels through the stud wall framing. Seismic mass will tend to be concentrated at the story levels, and inertial effects will be concentrated there.

The steel roof deck and the floor composite deck will act as diaphragms to transfer lateral loads to Special Steel Moment-Resisting Frames. The diaphragms are connected to collector beams which transfer the lateral loads to the frames. These collector beams will be specially designed for the lateral loads as required by the IBC.

A seismic joint will separate the new addition from the existing buildings at each level.

### Foundations

Foundations will be reinforced concrete spread footings. Footings will be designed in accordance with recommendations of the geotechnical engineer and soils report for the site. Perimeter footings will bear a minimum of 42" below grade for frost protection. Reinforced concrete pilasters will be placed on top of footings to support building columns. Footings at braced frames or moment frames may be placed deeper as required to provide uplift resistance. The building perimeter will have a continuous 8" thick concrete frost wall over a strip footing.
The perimeter basement wall will be 8" thick on a continuous strip footing.

The first floor will be a reinforced concrete slab on grade. Slab reinforcing will consist of steel rebar.

### Exterior Walls

Exterior walls will consist of 2x wood stud framing with plywood sheathing. Wood stud walls will be non-bearing, but resist wind loads.

Figure 8: foundation and slab systems

**Non-structural components**

Design of non-structural components shall be in accordance with the IBC and ASCE 7-05 and shall require project specific design prepared by a registered professional engineer or manufacturer's testing based on a nationally recognized testing procedure.

Non-structural components shall include architectural, mechanical and electrical components, supports, and attachments where damage due to earthquake may present a hazard to occupants or impair the continued operation of the facility.

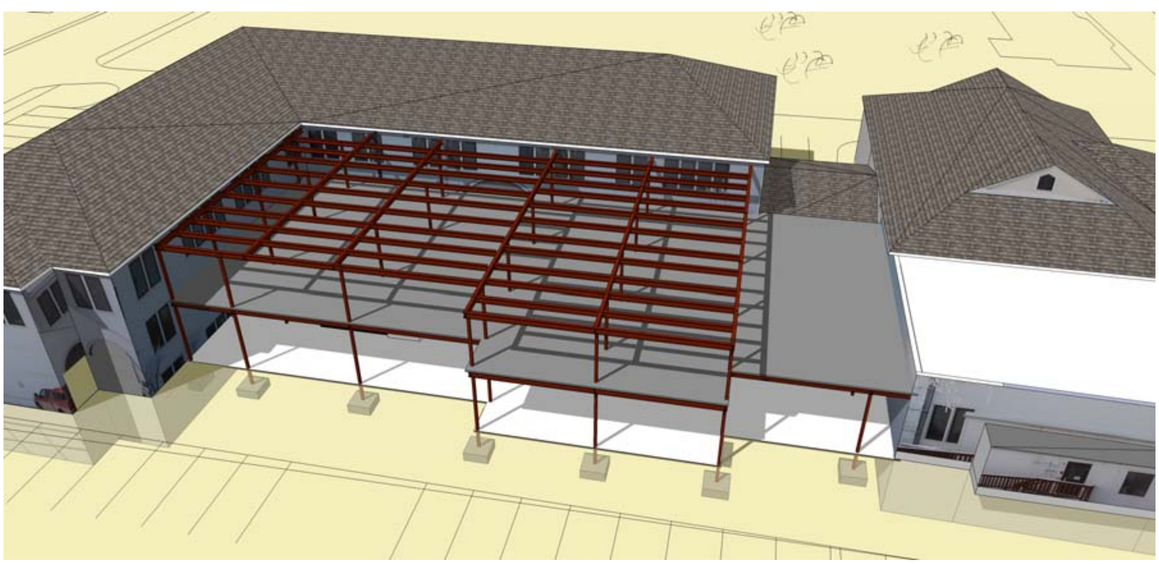

Figure 9: steel structure and slab systems

# MECHANICAL DESIGN CRITERIA

## Design Parameters

The building mechanical and plumbing design will conform to the latest adopted edition of the following building codes and guidelines:

| | |
|---|---|
| IBC | International Building Code |
| IMC | International Mechanical Code |
| UPC | Uniform Plumbing Code |
| IFC | International Fire Code |
| | NFPA 13 National Fire Protection Association, Standard for the Installation of Sprinkler Systems |
| ASHRAE 62.1-2007 | American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., Standard on Ventilation for Acceptable Indoor Quality |
| SMACNA | SheetMetal and Air Conditioning Contractors' National Association, HVAC Duct Construction Standards |
| ADAG | Americans with Disabilities Act Guidelines |
| NFPA 70 | National Electrical Code |

Equipment and systems incorporated into our design will be straightforward, reliable, easily maintainable and cost effective. The design will concur with LEED standards as a guide, but certification is not planned to be pursued for this project. All specified equipment will be items that are used throughout Alaska with maintenance, parts, and service locally available.

The design parameters, listed in this document, may be considered a working document as well. As the design progresses the parameters in this document may be revised as a result of changing technology, updated code interpretations, and/or feedback from the Owner.

## Plumbing

The existing water service enters the building through the basement wall of the existing boiler room. Domestic cold, hot, and hot water recirculation piping feeds out from the boiler room to various plumbing fixtures located throughout the facility. Domestic hot water for the facility is currently generated using a 50 gallon gas-fired water heater.

The existing building drain is connected to a local city sewer system.

The addition will incorporate new plumbing fixtures for restrooms areas and some sinks. The existing domestic water and sewer mains appear to be adequately sized for the new fixture loads with sufficient slope and grade; however, it will be verified during design.

New waste and vent piping will be cast iron no-hub. Plumbing vents through the roof will be minimized to serve groups of new plumbing fixtures in the addition. New plumbing fixtures, floor drains, and specialties will gravity drain to the existing sewer main.

New domestic water system piping will be Type L copper. New sprinkler piping will be specified to be any piping that meets the requirements of NFPA 13.

The existing gas-fired, domestic water heater is planned to be demolished and replaced with a new water heater. The new gas-fired water heater will be sized to incorporate new hot water loads from the new addition, as well as the existing hot water loads.

Plumbing fixtures and trim in the new toilet rooms for the addition will be commercial grade fixtures and specified to include water and energy saving devices. Vitreous china water closets will be wall-mounted, flush valves. Vitreous china lavatories will be wall-mounted with manual-operated faucets. New sinks will be stainless steel and counter-mounted. New drinking fountains will be wall-mounted, stainless steel without mechanical cooling.

All fixtures and faucets will be provided complete with all required specialties, trim, supports, and related items. Where accessible fixtures are required, products will be selected and installed in compliance with the American Disabilities Act Guidelines (ADAG). New fixtures are planned to be installed in the existing areas as remodel work progresses in the future.

Floor and wall cleanouts will be provided in the new addition area. Floor cleanouts will be placed in locations to minimize tripping hazards. Floor drains will be provided in the mechanical rooms and restrooms. Trap primers will be provided at all floor drains.

Wall mounted cold-water hose bibbs, with hose thread outlet, vacuum breaker, and lockable covers, will be provided to the exterior for wash down. Hose bibb locations will be coordinated with Architectural.

### Storm Drainage

Roof drains for the new addition will be provided for the new flat roof area. Roof and overflow drains will route separately, as required by code. The rainleader piping will connect to the existing local storm drain system, reference civil for storm drain design. Overflow rainleader piping is anticipated to exit the building using downspout nozzles to spill on grade; locations to be coordinated with Architectural.

### Gas Meter

The existing gas meter/regulator is located on the west side of the building, near the existing gymnasium. Natural gas piping supplied to the new boiler system will be Schedule 40 black steel with threaded joints for low pressure systems.

### Heating

The existing boiler plant for the building consists of three (3) Weil-McLain gas-fired, sectional cast iron, hydronic (hot water) boilers. They are located in the basement level in the boiler room. The existing heating piping distribution system circulates a hot water solution to all of the heating coils, baseboard, cabinet unit heaters, and unit heaters throughout the entire facility.

The existing boilers, as well as the existing circulation pumps, are nearing the end of their useful life. We recommend the existing boiler system be replaced with three (3) new gas-fired, high-efficiency boilers sized for the existing heating loads and new addition. We also recommend new heating piping, valves, expansion tank, air separator, circulation pumps, and glycol tank be provided.

Each of the three (3) new boilers will be sized for 40% of the total peak heating load of the complete building and staged in a lead/lag control sequence. The lead boiler shall be, automatically, alternated on a monthly basis and upon failure of the current lead boiler.

## Heat Distribution

The heating system fluid will be distributed by Type L copper piping and new circulation pumps. The hydronic heating solution will consist of propylene glycol and water mixed 50-50. The solution will be pre-mixed by the manufacturer and shipped to the site in sealed barrels. The solution will be inhibited to minimize system corrosion. The solution mixture will be compatible with all parts of the hydronic system.

The new circulation pumps will be provided in a primary and secondary arrangement. The secondary pumps will be equipped with variable frequency drives to serve the building terminal heating devices; one pump will be lead and one pump will be a stand-by pump to provide fully redundant pumps.

Work related to the new boiler system is planned to be mainly concentrated in the existing boiler room, with exception of routing new heating piping to serve the new roof-mounted air handling units located in the addition area. New heating mains in the boiler room will connect to existing heating mains where they penetrate the boiler room wall. The AHU heating coils will have 3-way control valves to keep the main piping warm and maintain minimum flows through the pumps.

A separate boiler system, located in the existing boiler room, currently serves the existing snowmelt system exclusively. This system is not planned for demolition and will remain in place.

## Ventilation

The air distribution system will be designed to conform to the SMACNA guidelines and ASHRAE Standard 62-2007 to ensure good indoor air quality.
The existing ventilation system consists of (2) indoor air handling units and a packaged gas-fired AHU located at the exterior. Both indoor air handling units are connected to mechanical cooling units; one is a chiller and the other is a condensing unit.

The (2) mechanical cooling units are currently located in an outdoor fenced area of the east courtyard; this places them within the planned addition footprint. While the existing ventilation system is planned to remain in place during construction of the addition, the existing mechanical cooling units will need to, temporarily, be relocated outside the construction zone. These units will be demolished in conjunction with future remodel work.

The existing packaged, gas-fired AHU and (3) existing condensing units are located in an outdoor fenced area near the gymnasium entrance. This equipment is also currently located within the planned addition footprint and will need to be temporarily located outside the construction zone. These units will be demolished in conjunction with future remodel work.

During construction of the addition, the (2) existing indoor air handling units and associated ductwork, diffusers, and appurtenances are planned to remain in place. The existing building is planned to be remodeled in phases after the construction of the addition. Demolition and replacement of the existing air handling units will be phased during future remodel work.

The addition will incorporate a new roof-mounted, 45 ton variable-air-volume air (VAV) handling unit, complete with mixing section, heating coil section, direct-expansion cooling coil section, filter section, an internally isolated fan section, and condensing unit.

The addition work will also provide space and roof structure for three (3) additional roof-mounted VAV air handling units (2 units at 35 tons and 1 unit at 40 tons) that will ultimately serve the existing building as part of future remodel work. Each unit will be installed as part of the work to remodel its respective area served.

Alternately, if the budget resources allow, all new rooftop air handling units will be installed as part of the first phase addition work. During construction of the addition, main ductwork and heating coil piping for the (3) units serving the remodeled area will be stubbed into the existing attic space of the existing west wing. These units will then connect to new ventilation systems as remodel work of their respective existing areas progress in the future.

Each of the proposed new rooftop AHU's will allow individual zone temperature control of each space for increased energy efficiency and occupant comfort. Each new AHU system would be able to simultaneously heat and cool separate spaces. The units will be capable of taking advantage of cooler ambient air temperatures for free cooling of the building during shoulder seasons. The VAV system supply air temperature will be reset based upon the air temperature required to cool the hottest room served by the respective unit.

Each air handling unit fan will modulate up or down as needed to meet the required demand load. $CO_2$ sensors and outside air intake measurement will be employed to further enhance ventilation to the facility and reduce energy consumption.

Due to the sound sensitivity of the office and assembly spaces, the sound data for the ventilation equipment will be thoroughly reviewed during design and sound attenuators are planned to be provided in the ductwork.

Perimeter heating units will be interlocked with a local VAV box to maintain space temperature. Each individual zone would be served by a VAV terminal unit equipped with a hydronic heating coil.

### Exhaust Air

New restroom areas will be provided with a central exhaust fan that will operate during occupied hours. Exhaust will also be provided to a new janitor's room, electrical rooms with transformers, and an elevator machine room to remove excess heat and odors.

### Ductwork

All new ductwork will be galvanized sheetmetal in accordance with SMACNA guidelines. Routing and configuration will be coordinated with the building layout and space available for installation.

### Sound Attenuators

Sound attenuators will be of galvanized perforated steel filled with acoustic material. They will be installed in supply and return ductwork mains to reduce sound levels produced by the ventilation system.

### Combustion Air

The boiler room will include only direct-vented boilers and water heater, which negates the needs of a designated combustion air system.

Flues listed for operation with direct-vent gas appliances will be specified to vent each boiler and water heater. Individual flues will be used for each boiler and water heater.

## Insulation

All new domestic hot, cold, and hot water recirculation copper piping will be insulated with preformed fiberglass semi-rigid insulation to prevent condensation and heat loss. Cold water pipe insulation will be specified with a complete vapor barrier. All new hydronic heating copper piping will be insulated with preformed fiberglass semi-rigid insulation. Insulated piping in the mechanical rooms, as well as all exposed piping within 10 feet of the floor will have a PVC protective jacketing system covering all pipes and elbows. All other piping will utilize all service jacketing (ASJ).

No piping will be routed exposed through finished areas. Piping will be concealed above the ceiling or in walls wherever possible. Soffit requirements will be coordinated with the architect where required to conceal piping and ductwork.

Plumbing vents will be insulated three feet down from their roof termination point with fiberglass insulation with all-purpose facing.

The hot water and waste piping under lavatories and sinks, designated to be ADA compliant, will be insulated with pre-formed, closed cell insulation with white cleanable plastic surfaces.

All exhaust ductwork within 10 feet of the exterior will be insulated with fiberglass with a Canvas finish.

## Fire Protection

The existing building currently has a fire sprinkler system installed. A standard wet-pipe sprinkler system, complying with NFPA 13, provides coverage throughout the facility. A dry system provides coverage to exterior canopies and areas where sprinkler piping is exposed.

The sprinkler riser is located in the main boiler room. The fire department connection is located on the west side of the building, near the existing gymnasium area. The existing system would have to be modified to incorporate a new addition and remodel of existing areas.

### Controls

The existing direct digital control (DDC) system is currently being converted from a Johnson Metasys system to Meridian Systems Automated Logic. The existing DDC system will be expanded to include the new HVAC equipment installed during initial construction of the addition, as well as future remodel work.

The new boiler equipment will be provided with factory controls that will allow connection to the new DDC system.

### Testing and Balancing

A Contractor specializing in the balancing and testing of mechanical systems will accomplish the testing and balancing. The contractor will verify system operation, control integration and adjust the systems to the design flow rates.

All new balance points will be marked in the field on the balance valves and dampers, as well as included in the balancing report that will become part of the operation and maintenance manual.

### Seismic Restraint

All mechanical equipment, piping, and ductwork shall be provided with seismic restraint in accordance with the latest adopted International Building Code (IBC).

## ELECTRICAL DESIGN CRITERA

The building and site new electrical design will conform to the latest adopted edition of the following building codes and standards as well as any amendments adopted by the State of Alaska:

- 2009 Matanuska-Susitna Borough Facility Design Criteria Manual
- 2008 National Electrical Code (NEC)
- 2006 International Building Code (IBC)
- 2006 International Fire Code (IFC)
- 2010 National Fire Alarm Code (NFPA 72)

- 2009 Life Safety Code (NFPA 101)
- Illuminating Engineering Society of North America (IESNA)
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- ASHRAE/IES Standard 90.1
- TIA/EIA Telecommunications Building Wiring Systems

Equipment and systems incorporated into this design will be energy efficient, reliable, easily maintainable and cost effective. All specified equipment will be items that are used throughout Alaska with maintenance, parts, and service locally available. Energy efficiency is the number one criteria for all electrical systems to reduce energy and maintenance costs. It is understood that this project will be designed to Leadership in Energy and Environment Design (LEED) standards; however submittal for certification is not planned. Lighting controls, fixture selection, light trespass elimination and other electrical design items will be developed to meet the LEED standards.

The design parameters listed in this document may be considered a working document. As the design progresses the parameters in this document may be revised as a result of evolving technology, payback analysis and/or feedback from Matanuska-Susitna Borough personnel.

### Power Distribution

The existing electrical service is 1600 amperes at 120/208V, 3-phase. A 225 kVA pad-mounted transformer, property of Matanuska Electric Association (MEA) is located outside the building by the entrance to the Foyer. Secondary underground feeders are routed to a current transformer (CT) enclosure with a meter base on the exterior of the structure. The service rated main disconnect is located in the Basement mechanical room in the Main Distribution Panel (MDP) and is rated for 1600 amperes. There is a service entrance shunt trip operator on the building exterior so that the service disconnect can be opened from outside the building.

The existing pad mounted transformer, CT enclosure with meter, and exterior shunt trip switch will have to be relocated away from the building to make room for the new addition and to remain accessible per MEA requirements. MEA will be involved to reroute and extend the primary circuit to the new location for the pad mounted transformer. MEA will also route new secondary conductors to the new CT enclosure location. The Contractor will provide new conductors to the existing MDP in the basement from the CT location.

Adjacent to the existing pad-mounted transformer is a generator enclosure on a concrete pad. The generator has a feeder that connects to the automatic transfer switch (ATS) in the first floor electrical room. A below-grade fuel tank is located near the generator enclosure.

The generator enclosure and fuel tank will have to be moved to the north side of the building to make room for the addition. A new concrete pad will have to be created for the generator enclosure. A new above-grade fuel tank will be provided for the generator fuel supply. New feeders (approximately 3 runs of 2-1/2" conduits) will be provided to connect to the existing ATS from the new generator location. A security fence will be provided around the generator enclosure and fuel tank.

The MDP feeds an exterior condenser, exterior chiller, and the 1200 amperes ATS that feeds to the old 800 amperes MDP located in the electrical room on the first floor. The old MDP feeds branch panelboards for lighting, mechanical equipment, and general facility power needs throughout the Foyer, Main Wing, New Wing, Gym and MIS areas of the building.

The branch circuit panelboards are located throughout the building. In the main wing and new wing, the panelboards are located in electrical closets that are stacked vertically, so that the electrical equipment on each floor is in the same plan location. In the foyer area the panelboards are located in the basement mechanical room and in the first floor electrical room.

The first floor electrical room which houses the old MDP, also houses the ATS, fire alarm panel, exterior lighting contactors, and card reader system. This first floor electrical room will remain as is for the new addition. As an option the 800A MDP could be replaced with a new 1200A MDP with capacity for all the existing feeders.

New interior secondary power distribution for the building addition will be supplied by new 120/208V branch circuit panelboards. All new distribution equipment will be sized for 20% spare circuit capacity for future loads. New panelboards will be located throughout the building addition to serve the loads while minimizing conductor lengths and voltage drop. These panelboards will be located in utility type spaces thus minimizing the need for dedicated electrical rooms. Locations will be coordinated with other disciplines so that Code required clearances are maintained for all the electrical panelboards.

All wiring, except for telephone/data communications systems and as noted below, will be installed in raceways. Raceways will be specified to be of the type suited for the application. To the maximum extent possible, conduit will be concealed in all areas except "utility" spaces. Flexible metallic conduit will be used for the extension of the building's fixed raceways to any vibrating or similar equipment. Branch circuits will be installed in ½" conduit minimum, with ¾" homeruns.

All "building" wiring (line voltage) shall be copper with type THHN (indoor) or XHHW (indoor, outdoor and feeder conductors) insulation and rated 600 volts. No wire for line voltage (120 volts to 600 volts) applications or ground wire for line voltage systems will be less than #12 AWG in size. All neutral conductors will be full size. An insulated green ground wire for all circuits will be provided. All conductors, including neutrals, passing through pull, junction and outlet boxes will be labeled with cloth markers or tubing type tags having clearly legible text to identify the panel and circuit number.

General purpose receptacles and light switches will be 20A, 120V commercial grade type with stainless steel wallplates. Integral Class 'A' ground fault circuit interrupters will be provided for receptacles in wet locations, on the building exterior and above countertops near sinks. Floor outlets will be provided in the large assembly rooms and large group meeting areas for power use away from walls. Special outlets of proper arrangement and rating will be selected to match such equipment. All receptacles will be labeled to identify the panel and circuit number. Device plates for special purpose outlets and receptacles having characteristics differing from the typical duplex receptacle will have clear adhesive labels identifying their characteristics. Exterior weather resistant receptacles with weatherproof covers will be provided as necessary for exterior use.

Branch circuits will be limited to six duplex or three quadraplex receptacles.

Induction motor loads less than one horsepower will utilize fractional horsepower motor starters with thermal overload unit, red pilot light, and toggle operator.

Induction motor loads rated more than one horsepower will utilize combination motor starter/disconnects with full voltage starter, motor circuit protector disconnect, and solid state overload relays. Three phase motor starters will include a power monitor for phase loss, phase reversal, and low voltage protection. Large motors over 5 horsepower will utilize reduced voltage starters or variable frequency drives if possible.

Motors or equipment loads requiring disconnect switches will utilize heavy duty, single throw disconnects with lockable handle, rated for the load served.

Emergency power will be provided by the generator. The generator will remain configured to power the entire building load so all new electrical loads will be on emergency power.

## Illumination

The light fixtures selected will be energy efficient, durable, and provide even illumination throughout the spaces. Special attention will be paid to selecting fixtures that both match and compliment the architectural features of the building.

Interior areas will benefit from the efficiencies of fluorescent lamps. In general, linear fluorescent lamps will be 48" in length, energy saving, low-mercury and long-life T8 or T5HO and will have high color-rendering indexes (CRI's). All fluorescent lighting will have a color temperature of 3500°K, except where a different temperature may be required due to finish colors, video recording or display work, etc. Energy consumption and efficiency must also be considered in selecting the most appropriate illumination source for each application. Use of compact fluorescent lamps will be limited. Light emitting diode (LED) luminaries will be used as an alternative to compact fluorescent fixtures where possible.

Fluorescent fixtures will be specified with electronic programmed rapid start ballasts for high efficiency and long life in areas where temperatures do not preclude the use of low-wattage lamps in conjunction with electronic ballasts. Electronic ballasts shall have $<10\%$ total harmonic distortion (THD) for high efficiency and long life.

General lighting will be provided by volumetric fluorescent luminaires. Exterior areas will be illuminated with full cutoff building mounted fixtures. Away from the main entrance the exterior lighting consists of existing pole mounted fixtures and wall mounted flood light type fixtures. Where existing parking areas are changed the lighting will be modified to match the new parking layouts. New circuits will be extended to the existing exterior parking lot lighting to accommodate new building construction. Circuits will be fed from existing controls in existing 1st floor electrical room.

Recessed LED down lights will be utilized above the reception desk, restroom alcove, and within the conference area. Pendant bi-directional fluorescent luminaires may be used in open areas with high ceilings to provide enhanced vertical illumination.

Lighting energy densities will be maintained as referenced in LEED design criteria. IESNA recommended illumination levels will be attempted to be met while remaining within the watts per square foot which is prescribed.

Emergency illumination will be provided by the normal space lighting fixtures because of the generator power. LED exit signs will be provided to indicate the path of egress.

### Lighting Control

Special attention will be given to the use of energy saving lighting controls and equipment. Lighting control schemes will consist of a combination of local wall switches, dimming systems, occupancy sensors, lighting control panels for the assembly area, photocells, building management systems, and timers to minimize wasted light energy per ASHRAE/IES Standard 90.1 and reduce maintenance costs.

Assembly room lighting controls will be flexible in design to accommodate the many uses of the space. Lighting controls will create different scenes for the assembly room functions such as meetings, conferences, presentations, public events, video recording, and teleconferencing.

New exterior lighting will be controlled by the existing exterior lighting controls so operation times are the same throughout.

Individual switches and controls for large area lighting will be provided to permit selective energy use when required. Where illumination level requirements are not constant, use of multilevel switching for fluorescent lamps will be provided. Other measures will include block or group switching of fixtures. Fluorescent fixtures will have lamps switched in combinations to permit varied control of light levels (33, 66 and 100% for 3-lamps and 50 and 100% for 4-lamps). Occupancy sensors will be utilized to minimize energy usage and improve lamp life wherever possible. It is recommended that occupancy sensors be installed (as a minimum) in small offices, closets, storage spaces, and areas where usage is infrequent.

### Communications and Special Systems

Special systems in the assembly hall will be designed for flexibility, ease of use, and excellent visual and audio reproduction. Assembly events require group communications and public involvement, so clear communication is critical. Audio and visual functions will require accurate recording and reproduction. Close coordination with the lighting system and controls will be provided so that video recording and conferencing events will be well lit and natural looking.

New telephone and data jacks will be provided in the building addition and connected to the existing telephone and data infrastructure in the IT building.

A wall mounted telecommunication rack will be installed for owner provided and installed equipment. Four port telecommunication jacks featuring RJ-45 input ports will be used at strategic locations with additional jacks installed as required for owner equipment, such as Wireless Access Points (WAP) and ceiling mounted projectors. Category 6 telecommunication cable will be routed by means of j-hooks above accessible ceilings and in conduit through concealed spaces. Each jack will have (2) two to (4) four dedicated 4pr Category 6 UTP cables routed back to the communications rack for connection to owners equipment.

The assembly hall will have hard-wired data jacks provided throughout, specifically at the assembly council table, podium, and staff support locations as well as complete wireless coverage provided by owner equipment.

Public address shall be provided at the new addition via ceiling mounted speakers tied to the existing telephone system for building wide general announcements.

A new hard-wired sound system will be provided specifically for the assembly hall for sound distribution during meetings and presentations. The design will be coordinated with acoustical and sound design engineers for maximum performance. Speakers will be provided for clear speech distribution for all locations in the assembly hall and lobby. Microphones will consist of table mounted devices at the council table and public podium, and wireless devices that can be used for variable locations. Flat screen televisions will be provided in the lobby area and in various locations in the assembly hall for distribution of presentations and video broadcasts. The sound system will include equipment for the hearing impaired so that all attendees can participate in events.

A new assembly voting apparatus will be provided to be used by Assembly members to register votes. A display panel will be wall mounted to display the results of the votes cast. The voting apparatus controls and inputs will be coordinated with the council table design for complete access by all Assembly members.

New building access and security devices will be provided at new building entrances and connected to the existing security system.

### Fire Alarm

New fire alarm devices will be provided in the building addition for code required coverage in the new spaces. The existing fire alarm panel (in the 1st floor electrical room) will be replaced to accommodate the new devices. Existing devices throughout the building will connect to the new panel, and gradually be replaced in future work.

A new Edwards System Technologies #EST3 addressable fire alarm system will be used to provide fire detection and alarm in the building.

The fire alarm system will be separate from the DDC system but will provide control signals to the DDC system. Sprinkler flow and valve position switches, manual pull-stations, combination horn with strobe units, supervision and other functions shall be controlled, monitored and annunciated from the Fire Alarm Panel (FAP). Power for the FAP will be supplied from the normal distribution system and an internal battery backup. A label shall be provided in the FAP identifying the panel board and circuit number supplying power to the FAP. The circuit breaker protecting the branch wiring to the FAP shall be provided with a protective device preventing accidental opening of the breaker with a warning label mounted adjacent to it stating, "Fire Alarm. Do Not Turn Off".

The module's components and interfaces that make up this system shall be UL/FM listed as suitable for such systems. The system shall be fully supervised and zoned.

A graphic annunciator, with alpha-numeric display will be located at the entry of the building closest to the fire department connection.

A digital alarm communicator will be included in the FAP to provide 24 hour monitoring of the fire alarm and sprinkler system.

Pull stations will be installed within 5 feet of exit doors, and horn strobes will be installed to alert occupants of an alarm. Smoke detectors will provide coverage with the exception of the restrooms and utility spaces where heat detectors will be provided. Duct smoke detection shall be provided to monitor the HVAC systems. Tamper and flow switches will tie in to the system for monitoring of the sprinkler system.

### Seismic Restraint

Electrical equipment exceeding the weight limitations will be provided with seismic restraint in accordance with the latest adopted International Building Code (IBC).

### Code Data

2009 International Building Code
Construction Type: V-A
Occupancy Group: Mixed

1. B – Business
2. A3 – Assembly
3. S1 – Storage

Building is protected by a fully automatic sprinkler system

### Occupancy Group: A3

Allowable Area: 6,000 s.f. / 1 level
A506.3 Allowable Area Increase due to Sprinkler System – 200%= 12,000 s.f. total
Actual Area:
Area 1 – Assembly Hall: 3,000 s.f.
Area 2 – Gymnasium: 5,421 s.f.
Total Assembly Area: 8,421 s.f.<12,000 s.f.

### Occupancy Group: B

Allowable Area: 18,000 s.f. / 3 levels
A507.4 Allowable Area Increase due to Sprinkler System – Unlimited Area provided 60' width public ways or yards. The structure complies with this provision

### Occupancy Group: S1

Allowable Area: 14,000 s.f. / 3 levels

A507.4 Allowable Area Increase due to Sprinkler System – Unlimited Area provided 60' width public ways or yards. The structure complies with this provision

### Code Analysis Summary: Life/Safety

This project proposes to increase the size of the existing MSB DSJ Administration Building but will not change the construction typology or accepted use of the existing facility. The existing building is a wood frame structure and is protected by an automatic sprinkler system.

This proposed addition will not change the way the building functions from a life safety perspective and does not increase the risk of occupants or visitors utilizing the facility. The Building Code limits the size of buildings due to risk factors and provides allowances in the code which enable certain facilities to increase the size based on performance criteria. In the case of the existing MSB DSJ Administration building, the facility is equipped with an automatic sprinkler system and is surrounded by public driveways and yards enabling fire fighters to easily access the entire facility. Finally, the building is not at risk from fire damage from nearby existing structures which combined with the other factors allows this building to exceed the minimum areas allowed by the building code and allow this addition to be constructed without special fire safety precautions.

## Attached Documents

1. Summary of Schematic Cost Estimate
2. Hazardous Materials Evaluation
3. Images of floor plans and assembly details
4. Existing Courtyard Utility Locations