Green Basis of Design Version 1.4

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INTRODUCTION

This document has been prepared for the Owner Partnership of the Mary Lowell Center. The three Partners of the project are:

National Park Service

US Forest Service

City of Seward

A. PURPOSE

The purpose of the Green Basis of Design (GBOD) memorandum is to establish and record the sustainable design criteria for the Mary Lowell Multi-Agency Center, located in Seward, Alaska. The document also addresses applicable codes and reference standards upon which the criteria are based.

The Basis of Design is a living document and will change as schemes are proposed, tested and refined through the design phase of the project. The GBOD describes performance characteristics of the new facility and coordinates with the cost estimate.

Once Contract Documents are begun, the GBOD is used to provide quality control on the green building strategies the team has chosen to pursue.

B. COMPANION DOCUMENTS

There are three other sets of documents relevant to the project:

Reference Documents

These documents provide additional information about systems described in the GBOD

1. Concept Design Alternatives Phase, May 11th 2004, The Portico Group
2. Schematic Design Drawing and Program Documents, The Portico Group
3. Schematic Design Narratives:

   Mechanical, Electrical & Plumbing: Stantec Engineering

   Interiors: NB Design Group

   Structural: Tetra Tech

   Lighting: Candela

Compliance Documents

These documents set minimum performance requirements.

1. ASHRAE 90.1-2004
2. International Building Code 2003
3. Uniform Plumbing Code 2003
4. National Electric Cods 2002

LEED Related Codes and Standards

These documents are the basis for the performance criteria described in the GBOD. They shall be read with equal strength as the Compliance Documents, but in some cases building, health and local codes and regulations may override these standards.

1. United States Green Building Council (USGBC) LEED 2.2 Rating System and Reference Guide. These documents can be purchased from the US Green Building Council at www.USGBC.org.
2. U.S. Environmental Protection Agency (EPA) Storm Water Management for Construction Activities, Chapter 3, EPA Document No. EPA-832-R-92-005. www.epa.gov/ow
3. U.S. EPA Energy Star Roofing Program. Yosemite1.epa.gov/estar/consumers.nsf/content/roofbus.htm
4. ASHRAE 90.1-2004 Energy Standard for Buildings Except Low-Rise Residential Buildings
5. ASHRAE 62.1-2004, Ventilation for Acceptable Indoor Air Quality
6. ASHRAE 55 – 2004, Thermal Environmental Conditions for Human Occupancy
7. ASHRAE Fundamentals, Chapter 31 Space Air Diffusion
8. U.S. Department of Energy International Performance Measurement and Verification Protocol (IPMVP). www.ipmvp.org
9. New Buildings Institute Benchmark v1.1, January 2005.
10. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Guidelines for Occupied Buildings Under Construction, 1995.
11. South Coast Air Quality Management District Rule #1168 Adhesives, Sealants and Primers, Effective 2005 standards. www.aqmd.gov
12. Green Seal Standard GS-11 Paints, First Edition, May 20th 1993
13. Green Seal Standard GC-03 Anti Corrosive paints, Second Edition, January 7th, 1997
14. South Coast Air Quality Management District Rule #1113, Architectural Coatings, Effective 2005 standards. www.aqmd.gov
15. Bay Area Air Quality Management District, Regulation 8 Organic Compounds Rule 51: Adhesive and Sealant Products. www.baaqmd.gov
16. Carpet and Rug Institute Green Label Plus Testing Program Limits. www.carpet-rug.com

DESIGN CRITERIA

A. GENERAL

The performance criteria contained in this section are based on the sustainability goals set for the project. These guidelines include proven measures that improve the environmental and economic performance of buildings.

Implementing these guidelines is not a prescriptive process. In a green building approach, targets for environmental performance are set and design and analysis are used to arrive at the optimal solution. This approach requires careful planning in establishing goals, setting priorities, analyzing options, and measuring results.

B. GREEN BUILDING OBJECTIVES

Site

The project sits adjacent to Resurrection Bay which is known for its pristine waters and diverse marine habitat. All City of Seward generated stormwater (rain and snow) is typically drained into Resurrection Bay. Design consideration will be given to reduce the stormwater impacts that the building will have on the habitat of the bay. Stormwater generated on site will be collected and infiltrated into the ground via bio-swales, wherever feasible. All stormwater that is generated on site will be treated for Total Suspended Solids (TSS) prior to leaving the site. If insufficient area is available to infiltrate water, a treatment vault may be used, which can be located below the entry plaza.

Light pollution will be reduced through the reduction of exterior lighting and the use of full cut-off luminaries. Up-lighting will be carefully controlled as to not permit any direct beam illumination from spilling on non-building surfaces.

Water Conservation

The goal is to reduce overall potable water consumption by 40% or more. This target will be achieved primarily through use of low-flow fixtures. Options to explore include, but are not limited to waterless urinals, dual-flush toilets, dual-flush valves and low-flow lavatories. Landscaping water use reduction will occur through the installation of native or drought tolerant plants, with no permanent irrigation being used to maintain the landscape. A temporary watering strategy will be used to establish plants for the first year after planting.

Energy Efficiency

All elements of the building that contribute to the energy budget shall be considered based on their measurable performance characteristics. Target areas include the building envelope, heating & ventilating systems, lighting and water heating. Although

many energy-saving measures will be implemented in the building, primary strategies shall include a high-performance building envelope, thermal massing, radiant floor heating, natural ventilation, daylight harvesting and ventilation heat recovery.

Performance Standard: The project shall use ASHRAE 90.1-2004 as the reference energy performance standard.

1. The project shall exceed this performance standard by a minimum of 10% to 20% through a variety of design measures.
2. Demonstration shall be by an energy simulation of the design building as well as a baseline building to determine the percentage of energy savings. An Energy Cost Budget (ECB) Report as described by the reference standard is required.
3. Prepare and test an energy simulation model of the project using DOE-2 based software.
4. Commissioning: The Owner shall hire a commissioning agent to perform commissioning tasks.

The project will also explore renewable energy systems, such as wood burning furnaces, and fish-oil/bio-diesel. Renewable energy systems will only be utilized if they can meet the maintenance and fuel supply availability requirements of the Partners who will be housed in the building.

Materials

Product selections for buildings shall contribute to the highest content of locally manufactured or extracted materials and recycled content. This will be a challenge as the definition of "local" basically restricts the products to resources available in Anchorage. Materials that need to be shipped through waterways or by rail shall be selected based on availability of the departure city for such transport. Refer to LEED Reference Guide for definitions of "manufactured" , "extracted, harvested, or recovered" and "post consumer recycled content & post-industrial recycled content." Goals for material selection include:

A minimum of 10% of all building materials used on the project (by cost) shall be manufactured, harvested/recovered/extracted within 500 miles of the project site.

A minimum of 20% of building materials by total cost will have a recycled content value as determined by multiplying the material cost by the post-consumer content percentage plus ½ the post-industrial content.

Targeted (recycled and/or locally manufactured) materials include the following:

1. CMU
2. Concrete (aggregate, cement, sand, fly-ash)
3. Plaster
4. Steel framing

5. Rebar
6. Gypsum wall board, paneling
7. Acoustic ceiling assembly
8. Concrete pavers
9. Paints/stains
10. Paving surfaces
11. Acoustic and Wall/Roof insulation
12. Wood

Interior systems shall be specified based on the consideration of program flexibility, functional adaptability and future replacement or disposal.

Environmental Quality

The ventilation design will provide a healthy and energy efficient delivery of fresh air. To achieve this goal, the project team will explore options such as Under Floor Air Delivery, use of CO2 demand control ventilation, and careful design of ductwork and diffuser selection. Minimum ventilation rates will be maintained to help mitigate any potential for Sick Building Syndrome. All interior finishes and furniture systems will be selected based on their impact to Indoor Air Quality (IAQ). Careful specification of low Volatile Organic Compound (VOC) paints, adhesives, coatings and primers will also help ensure good IAQ. Urea Formaldehyde (UF) will not be used in any composite wood or adhesives.

During construction, the project will develop and implement an Indoor Air Quality plan based on ASHRAE, SMACNA, and LEED standards. The plan shall indicate how the design will mitigate construction impacts on indoor air quality.

PROJECT OUTLINE

A. SUBSTRUCTURE

BASEMENT

A010 Standard Foundations

Concrete: To the extent available, the concrete mix shall contain a minimum of 10% and a maximum of 40% fly-ash substitution for cement, and aggregate from within 500 miles.

A020 Special Foundations

No requirements identified.

A030 Slab on Grade

The lobby spaces for public areas located on vacated Washington Street will feature radiant heating. Radiant tubing will either be embedded in the slab or located in a topping slab. All tubing layouts will need to be coordinated with any anchoring devices for permanent or temporary exhibits.

All slabs will be insulated and feature a water barrier. Refer to ASHRAE 90.1-2004 for appropriate insulation values. Energy simulations will be run which may increase or decrease the recommended R-values for insulation values found in ASHRAE 90.1-2004.

Concrete: To the extent available, the concrete mix shall contain a minimum of 10% and a maximum of 40% fly-ash substitution for cement, and aggregate from within 500 miles.

A040 Basement Excavation

To the extent possible, excavated soils should be utilized in the public plaza to fill the former basement of Old Solley's. All other soils should be removed to a local site to reduce the magnitude of transportation costs and emissions.

A050 Basement Walls

All walls will feature exterior insulation and water barriers. Refer to ASHRAE 90.1-2004 for appropriate insulation values. Energy simulations will be run which may increase or decrease the recommended R-values for basement wall insulation values found in ASHRAE 90.1-2004.

B. SHELL

SUPERSTRUCTURE

Daylighting: Daylight will be provided to open offices and meeting spaces through the use of high performance glazing, interior daylight louvers, clearstory glazing, skylights, interior shutters, mini-blinds and select exterior louvers. A central atrium will be used to distribute daylight to all three floors of the Office wing. This will serve to supply daylight to interior spaces but also balance daylight from perimeter areas. Dimmable lighting fixtures will supplement daylit spaces and shall be integrated with the daylighting and lighting control strategy. Daylighting goals include:

1. Maximize daylight penetration within 15-feet of exterior walls.
2. Provide an average daylight factor of 4 - 5 in office areas.
3. Provide an average daylight factor of 1-2 in common areas to the extent possible, particularly in atria and conference areas.

EXTERIOR CLOSURE

The building is located in Seward, AK, which is located within Zone 7 as defined by ASHRAE 90.1-2004. All envelope requirements will meet the prescriptive requirements of Table 5.5-7. An exception to any of the requirements found within ASHRAE 90.1-2004 may be taken provided that energy simulations demonstrate that increased energy performance can be attained.

B010 Exterior Walls

The primary cladding of major facade areas shall be high-quality materials that have a minimum life expectancy of 50 years, without requiring significant maintenance or experiencing significant deterioration. The ability to withstand salt corrosion and temperature extremes will be at the top of the selection criteria.

Durability: Durability and ease of maintenance shall be considered during selection. Brick, concrete, stone, tile, preformed zinc panels, recycled plastic lumber, composite concrete & wood panels, and glass are all examples of acceptable materials. Stucco, fiberglass and wood cladding should be limited in application to areas that are protected by overhangs from direct sun and ice dams to increase the life of these materials.

Moisture Protection: Rain screen principles shall be used in the design and selection of the cladding system.

Thermal Control: The thermal properties of the exterior closure components are to be determined using ASHRAE 90.1-2004, and optimized through the energy modeling. Thermal bridging effects shall be considered in the modeling assumptions.

Air Sealing: Provide continuous air/vapor barrier features at all exterior exposures. Seal all barrier penetrations tightly.

Caulks/sealants: All caulks and sealants inside the vapor barrier must meet the requirement of TVOC emissive content less than 20g/L.

Vinyl will be avoided due to environmental concerns over its production and disposal. While there is not universal acceptance to claims made by environmentally based organizations, the project may avoid all concerns by not selecting vinyl or PVC based materials.

B020 Exterior Windows

Framing: Window framing will be determined based on energy performance, cost and environmental impact. All frames shall contain a thermal break to limit conductive gains from the exterior to the interior. A preliminary ranking of frame materials is as follows:

1. Thermally broken Aluminum
2. Wood w/ exterior aluminum cladding
3. Fiberglass
4. Composite

Glazing: Specific properties of the glazing are described below:

1. Solar Heat Gain Coefficient (SHGC) ratio will be in the range of 0.6 (windows will be externally shaded as needed to limit solar gains during the cooling season)
2. Visual Light Transmittance will be between 60 and 70%
3. U-Factor will be less than 0.44
4. Glazing will have a low visible reflectance

B030 Exterior Doors

Exterior exiting doors shall be painted and insulated steel. All frame assemblies will have thermal breaks to prevent conductive gains.

Any exterior glazed entrance doors will feature continuous fame assemblies to reduce infiltration and increase insulation opportunities. All main entrances will feature dual doors and vestibule areas to prevent heat loss during occupant entry/exit.

ROOFING

B010 Roof Coverings

Flat or low sloped roofs: Light colored roofing with a minimum Solar Reflectance Index of 78 will be considered. A black roof will be considered as an alternative that may reduce the effects of ice damming. Double layers of roofing will be installed in areas in which ice and snow may land from overhangs or sloped roofs.

Sloped or Steep Sloped Roofs: Zinc and/or aluminum standing seam roofs will be utilized. All sloped roofs shall have high insulation values to reduce the potential for ice damming.

B020 Roof Openings

The roof may feature roof monitors and/or skylights that will serve to provide daylight and ventilation for spaces below. The vertically oriented planes will consist of operable louvers, glazing and/or operable windows. West facing glazing will be avoided and overhangs will be designed to maximize daylight penetration. Southern facing louvers would increase ventilation of the building during the summer time. All vertically oriented louvers will be designed to prevent back drafts from strong southern winds.

C. INTERIORS

INTERIOR CONSTRUCTION

C010 Partitions

Interior Walls: Interior walls will be gypsum board over finger jointed wood or steel studs. Gypsum board will be made of synthetic gypsum, or wall board with recycled content.

Acoustics: The design team shall provide an acoustic management plan that addresses reverb time, signal to noise ratios, and background noise.

1. Provide an exterior wall assembly Sound Transmittance Class (STC) of 40
2. Meeting room to office STC of 50 or higher
3. Office to office STC of 50 *
4. Office space to be designed to NC -30 (Noise Criteria)
5. Meeting rooms to NC – 30

* Enclosed offices may require additional acoustic separation to accommodate the needs of executive occupants.

C020 Interior Doors

Whenever possible interior doors will be FSC certified wood doors. Doors will not contain any composite wood materials and will be specified as stave core.

C030 Specialties

STAIRCASES

C010 Stair Construction

Stair treads will feature sustainable tread materials. Options include salvaged wood, Urea-Formaldehyde (UF) free cork, or Green-Label Plus certified carpet or other recycled/rapidly renewable content.

C020 Stair Finishes

All painted steel handrails will have VOC content less than 250 g/L. Any composite wood products will be UF free. All finishes should be durable and easily cleaned.

INTERIOR FINISHES

The interior finish palette shall consist of materials that have passed general screening criteria for indoor air quality (IAQ). Products that contain UF resins used as binders or adhesives will be excluded from consideration. Products will be selected based on the following material goals:

Material does not contain VOC concentrations greater than 500mg/m2xhr maximum total source strength.

Product is locally extracted, recovered, harvested and manufactured within a 500 mile radius of Seward, AK. If this is not possibly, an alternative is to specify a product that is extracted, recovered, harvested and manufactured within a 500 mile radius of rail and waterway distribution hubs to Seward, Anchorage and Homer.

Product is salvaged from the demolition of existing structure. An example may be the salvage of large wood beams from the demolition of Old Solley's.

Product is rapidly renewable (defined to be regenerated within a ten year timeframe).

Product contains FSC certified wood content.

Product contains recycled content.

Product does not contain vinyl or PVC.

Product is durable, easily cleaned and easy to replace with minimal impact to surrounding surfaces.

Product does not utilize site applied adhesives, paints, coatings, stains, shellacs. etc…

Product is made of component assemblies that may be deconstructed or replaced with minimum impact to other finishes.

Product maintenance does not require the use of bleach, or other products that release VOCs or toxins that can be absorbed by other materials. Refer to the list of approved Greenseal GS-11 cleaning products to determine that there is an environmentally preferable cleaning product for all finish materials.

All copy rooms and janitor closets will feature deck-to-deck partitions or be constructed with hard lid gypsum ceilings to prevent air mixing with other naturally or mechanically ventilated spaces.

C010 Wall Finishes

All sealants used as a filler shall be specified to meet or exceed Bay Area Air Quality Management District Reg. 8, Rule 51.

All composite wood and agri-fiber products shall be sourced sustainably.

Wall reflectivity: 70% minimum.

Adhesives, sealants, paints, primers, coatings, stains, shellacs and other protective finishes : Must meet the requirements outlined by the standards located in Section: **B. LEED Related Codes and Standards**. A summary of these standards is included in the tables below:

Architectural Applications	VOC Limit [g/L less water]	Specialty Applications	VOC Limit [g/L less water]
Indoor Carpet Adhesives	50	PVC Welding	510
Carpet Pad Adhesives	50	CPVC Welding	490
Wood Flooring Adhesive	100	ABS Welding	400
Rubber Floor Adhesives	60	Plastic Cement Welding	350
Subfloor Adhesives	50	Adhesive Primer for Plastic	650
Ceramic Tile Adhesives	65	Contact Adhesive	80
VCT and Asphalt Tile Adhesives	50	Special Purpose Contact Adhesive	250
Dry Wall and Panel Adhesives	50	Structural Wood Member Adhesive	140
Cove Base Adhesives	50	Sheet Applied Rubber Lining Operations	850
Multipurpose Construction Adhesives	70	Top and Trim Adhesive	250
Structural Glazing Adhesives	100		
Substrate Specific Applications	**VOC Limit [g/L less water]**		
Metal to Metal	30		
Plastic Foams	50		
Porous Material (except wood)	50		
Wood	30		
Fiberglass	80		

Aerosol Adhesives:	VOC weight [g/L minus water]
General purpose mist spray	65% VOCs by weight
General purpose web spray	55% VOCs by weight
Special purpose aerosol adhesives (all types)	70% VOCs by weight

Composite wood products shall be low VOC composition and not contain any added urea-formaldehyde resins.

1. Panel Material (Medium Density Fiberboard, or MDF): Must meet the requirements of ANSI A208.1-1994: concentration .3 PPM at a loading factor of 0.8 (ft2/ft3).
2. Particleboard decking: Shall meet the requirements of ANSI A208.1-1993: concentration 0.3 PPM at a loading factor of .13 (ft2/ft3).
3. All particle board applications will explore the use of wheat or strawboard products in lieu of MDF.

C020 Floor Finishes

Floor finishes will be carpet, linoleum, ceramic tile, natural stone, UF free bamboo, salvaged wood, exposed aggregate concrete and polished concrete. Floors that feature

radiant heating shall minimize the use of insulating materials. Floors that feature Under Floor Air Distribution shall be carpet tile or other tile material that integrates with a raised floor system.

Carpet: All carpet systems shall be specified to meet or exceed the requirements of the Carpet and Rug Institute (CRI) Green Label Plus Testing Program. These requirements apply to carpets, cushion, and adhesives. Material safety data sheets shall be acquired from each product manufacturer to verify compliance. Any adhesives used for carpets or pads must have a VOC content of less than 50 g/L.

Floor reflectivity: 30% minimum.

C030 Ceiling Finishes

Ceiling Finishes - The finish will be distributed as follows:

1. The structure will be exposed for the majority of spaces. All decking materials will feature low VOC finish applications as outlined in Section **C010 Wall Finishes**.
2. Acoustic ceiling tile will be in limited applications in which a physical separation is required between spaces. A tile reflectivity of 90% or greater is required.
3. Hard lid GWB for all copy rooms, janitor closets, and chemical pollutant areas.
4. Ceiling reflectivity: 80% minimum.

Alternate finishes may be proposed, but should be light colored to promote a good daylighting scheme.

D. SERVICES

CONVEYING SYSTEMS

D010 Elevators

Energy efficient and synergy driven elevators will be considered to reduce energy consumption.

D020 Escalators & Moving Walks

Not applicable.

D030 Material Handling Systems

If the design moves forward with a wood-chip fed boiler, a loading/hopper device to feed the boiler will be required.

PLUMBING

All plumbing fixtures shall be institutional grade. Fixtures shall be specified as low-flow, aerated or waterless when possible, so as to meet the goal of 40% water savings.

Hot Water Recirculation Systems: Install for any pipe runs longer than 75ft.

HDPE, LPDE, PP and other non PVC based piping is preferred over any PVC based piping.

D010 Plumbing Fixtures

Water fixtures will be low-flow fixtures. Sample fixtures may include the following flow rates:

1. Lavatory Aerator faucets: 0.5 gpm
2. Kitchen/break room sink aerator faucets: 1.0 to 1.8 gpm
3. Low-flow showerheads: 1.8 gpm
4. Showers and changing facilities shall be installed to accommodate 0.5% of full-time equivalent building staff.

D020 Domestic Water Distribution

D030 Sanitary Waste

1. Toilets and urinals will be low-flow fixtures. Sample fixtures may include the following flow rates:
2. Dual-flush water closets: 0.8/1.6 gpf
3. Dual-flush valves: 1.1/1.6 gpf
4. Waterless urinals: 0 gpf

D040 Rain Water Drainage

All stormwater (from parking areas and building roof areas) should flow through treatment systems to remove a minimum of 80% of TSS prior to distribution to city storm lines that eventually flow into Resurrection Bay. All parking areas will feature stormwater collection that will flow into vegetated swales to reduce rate and quantity of stormwater as much as possible.

D050 Special Plumbing Systems

Not applicable.

D060 HVAC

The building will be designed to reduce the energy consumption by:

1. A high performance envelope that utilizes low U-factor assemblies and glazing systems that are determined to be optimal through DOE 2 compliant modeling software.
2. Exposing thermal mass to the interior of the building through use of concrete, stone and wood materials
3. Insulted interior shutters that reduce vision glazing during winter months and that completely close during the night to retain heat
4. Operable windows, clerestories and skylights that may be used to promote both cross and stack ventilation during the summer months
5. High efficiency fans, boilers and other mechanical equipment
6. The MLC staff will also contribute to energy savings by accepting a wider range of interior temperatures during peak summer conditions for office spaces, consistent with the ASHRAE 90.1-2004 expanded comfort range for naturally ventilated spaces.

The above considerations will replace the need to install chilling equipment for comfort conditions.

All ventilation will be sized in accordance with ASHRAE 62-2004 and be controlled by CO2 demand. All spaces that have an actual occupancy greater than 25 persons per 1,000 SF will have CO2 monitors located 3-6′ AFF. The system may be sized to increase ventilation rates to 30% above ASHRAE 62-2004 volumes.

UFAD may be considered for all high occupant and variable occupant spaces, such as the public meeting rooms, auditorium and theater. For all UFAD heated spaces, hot water will be supplied to floor located VAV boxes to reduce the need for ductwork.

Performance of all buildings relative to standards shall be as follows:

1. Energy: The buildings will exceed the energy requirements of ASHRAE 90.1-2004 by at least 15%.
2. Ventilation, pressurization, and air change rates will be provided in accordance with ASHRAE 62.1-2004 (Ventilation for Acceptable Indoor Air Quality) and applicable local codes.
3. Thermal Comfort: Naturally ventilated spaces will meet the expanded comfort zone requirements of ASHRAE Standard 55-2004 for most hours of the year. During peak summer hours, temperatures have the potential to exceed the upper

limit of the comfort zone. The mechanical engineer will work with the client to determine an acceptable range of temperatures during these peak times. Mechanically ventilated spaces will meet the comfort zone requirements of ASHRAE Standard 55-2004 for all hours of the year.

D070 Energy Supply

The site will be supplied with electricity only. Systems will be optimized to use the most efficient fuel type available. Renewable energy sources, such as fish-oil bio-diesel, waste wood and/or wood pellets will be considered. If renewable systems are found not to be economically feasible, propane or fuel oil will be utilized and selected based upon combustion efficiency, emissions, and availability. Natural gas is not an option to the project.

D080 Heat Generating Systems

Boilers located in the basement will provide heating water for radiant floors in all areas, except locations in which UFAD is utilized. Incremental perimeter radiant heating systems will be provided as needed.

D090 Cooling Generating Systems

Ozone Depleting Substances: If chilling equipment is needed (base building HVAC or computer room HVAC), the systems will eliminate the use of CFC or HCFC in HVAC systems, insulation systems, and building operations and maintenance.

1. R407c, R134a or R410a (a CFC and HCFC free refrigerant) will be used in lieu of other ozone depleting substances.

D0100 Distribution Systems

The office spaces within the building will use operable windows as the primary means of providing ventilation during the summer. Ventilation ductwork will provide ventilation to occupants during the winter. All ducts will be sized to provide additional ventilation of 30% above ASHRAE 62-2004.

The public spaces within the building may use Under Floor Air Distribution for heating. Proper commissioning, calibration and maintenance are critical in achieving optimized performance.

1. The height of the plenum will be 1′-6″.
2. A pressurized plenum system will be used.
3. The maximum distance between the plenum inlet and point of discharge into the space will be 60 ft.

4. Swirl or mixing diffusers will be specified to promote stratification of the air in the space. The throw height of each diffuser shall not exceed 70% of the total floor-to-ceiling height.
5. The maximum allowable vertical temperature difference will not exceed 5 F per ASHRAE 55-1992.
6. Prior to installation of the raised floor system, the floor slab will be cleaned and sealed to reduce dust and bacterial growth.
7. The perimeter of the building will allow for different supply temperatures, volumes or distribution system to account for fluctuating conditions due to envelope loads.

Duct design shall minimize contact of fibrous fireproofing with airstreams by separating and/or encapsulating areas of fibrous insulation with the air stream.

1. Eliminate all interior duct liners and loose mineral fiber in contact with indoor air.
2. Where elimination is not possible, use drywall enclosure to eliminate contact of air stream with fibrous insulation.
3. Return and supply ducts shall be configured for regular access and maintenance.
4. Air Flows: Ensure a minimum flow of 30 CFM outside air per person.
5. Provide dedicated 100% exhaust for all copy and janitor rooms.
6. Locate intake grills away from on-site environmental hazards.

Operational filter efficiency: Minimum Efficiency Rating Value (MERV) 8 during construction, MERV 13 final filters installed prior to beginning a consecutive 14-day flushout and replaced again prior to occupancy with new MERV 13 filters.

D0110 Terminal & Package Units

To be determined.

D0120 Controls & Instrumentation

Energy Management System: The EMS shall provide sufficient Input Output points to address the long-term continuous measurement and performance of all the building systems through a combination of whole building metering and monitoring some or all of the following systems:

1. Lighting systems and controls
2. Constant and variable motor loads
3. Heating load
4. Cooling load

5. Economizer and heat recovery cycles
6. Air systems control and monitoring including CO2 level monitoring for ventilation control.
7. Building specific process energy efficiency systems and equipment

D0130 Special HVAC Systems & Equipment

All housekeeping or cleaning supply rooms and dedicated copy or printing rooms will be exhausted separately from the building return air, with no air recirculation. The exhaust rate must meet 0.50 cfm per square foot, and maintain a negative pressure of at least 7 PA within the space.

D0140 Systems Testing & Balancing

Commissioning: Commissioning shall be developed per LEED™ Commissioning Guidelines that are listed in the LEED NC 2.2 Reference Guide to meet the requirements of EA prerequisite 1. The commissioning responsibilities will be shard by the design team and the Owner's commissioning agent as described below:

1. Bid Document Specifications: The specifications are Division 1, Commissioning Specifications (specifically, 01810 General Commissioning Requirements, 01813 Sample Pre-functional Checklists, and minor additions to Division 1 sections such as Summary, Submittal Procedures, Operations & Maintenance Data, and Demonstration and Training) and commissioning performance criteria for building equipment in Division 15 (mechanical) and 16 (electrical) Specifications.
2. Initial Commissioning Plan: An Initial Commissioning Plan that outlines the general approach to commissioning the MLC project must be included in the specifications. The plan provides acceptable commissioning processes, identifies the project systems that will be commissioned, and states the location of equipment acceptance criteria within the bid document specifications. The Commissioning Plan is termed "initial" because the owner's Commissioning Agent (hired by the Owner on separate contract from the design team) and the general contractor must provide additional information that the design team does not have access to.
3. The Commissioning Agent is to review and modify the plan per their expertise, and per potential changes to the design as the project goes through construction activities. The general contractor must submit to the Commissioning Agent a directory of individuals for all trades responsible for equipment and systems identified as subject to commissioning.
4. Pre-functional Checklists: Division 1 Commissioning bid specification samples of Pre-functional Checklists to be used by the Commissioning Agent and Contractor for documentation. Based on the sample forms and submittal data provided by the Contractor, the Commissioning Agent will develop a

complete set of Pre-functional Checklists for all necessary tests and provide them to the Contractor. The checklist items are required to be completed prior to initiating commissioning functional tests.

5. Commissioning Functional Tests: The Commissioning Agent carries out a functional test for each commissioned system identified in the Bid Document Specifications. Each test includes measurements of the system's performance to verify that the system meets the acceptance criteria identified in the Bid Document Specifications.
6. Commissioning Report: The Commissioning Agent writes a Commissioning Report that documents the performance of the systems.

Flush out: After completion of construction, and prior to occupancy, flush-out with 100% outside air for 14 days. Temperature shall be above 60 F and relative humidity should be below 60%.

FIRE PROTECTION

The building shall meet provisions for non-combustible construction.

D010 Fire Protection Sprinkler Systems

D020 Stand-Pipe & Hose Systems

D030 Fire Protection Specialties

D040 Special Electrical Systems

ELECTRICAL

D010 Electrical Service & Distribution

D020 Lighting & Branch Wiring

Ambient Illumination levels shall be:

1. Open Office Area: 35 fc average ambient illumination at 30 inches Above Finish Floor (AFF).
2. Closed Offices: 35 fc average ambient illumination at 30 inches AFF.
3. Task lighting at work surfaces: Additional 40 fc at work surface.
4. Corridor Area: 20 fc average ambient illumination on finish floor.
5. Emergency Egress: 10 fc average along egress paths.

Visual environment:

1. Deliver light to the ceilings and walls and provide balanced surface luminance ratios using the Illuminating Engineering Society (IES) recommendations.
   a. 3:1 task lighting: near surround
   b. 10:1 task lighting: far surround
2. Control daylighting and electric lighting to provide a glare free VDT working environment, based on IES RP-24.
3. Reduce glare through design of interior finishes and lighting layout based on IESNA RP-1.

Table 1. Summary of recommendations from IESNA RP-1

Illuminance on desk (fc)	Task: surround luminance ratio	Task: wall luminance ratio	Ceiling max/min luminance ratio
30 – 50 (20 – 30 general; 30 – 45 task)	3:1	10:1 or 1:10 40:1 max. outside field of view	preferred: 4:1 acceptable: 10:1

Lighting technology:

1. Emergency & Exit Lighting shall use LED exit sign fixtures.
2. Ballasts: High frequency electronic ballast's with max. 20% harmonics and power factor >0.95. Dimming ballast shall continuously dim down to 10% light output. Dimming curve to be determined.
3. Lighting controls with photocell input shall serve all open office spaces within 15 feet of a perimeter wall. Lighting controls with occupancy sensor input and manual controls shall be provided for each enclosed office of the non-perimeter area.
4. Open office zones shall have a split task and ambient lighting scheme to reduce overall power density.
5. Lamps: Provide T8 or T5 lighting fixtures for office lighting, CF for wall sconces and recessed downlights, MH or fluorescent for lobby, atrium and parking areas.
6. Lighting power density:
   a. Office Area: Lighting power density maximum of 1 watt/sq.ft.

b. Parking Area: Lighting power density not to exceed 80% for exterior areas and 50% for facades of ASHRAE/IESNA 90.1-2004 standards

D030 Communication & Security Systems

Data Systems: Provide properly designed raceway, oversized by 50% for future use. Connections shall be Category 6.

D040 Special Electrical Systems

Lighting controls are designed to specifically fit programmatic needs:

1. Provide photo sensors in daylight perimeter zones of the building for ambient lighting levels.
2. Provide motion detectors and occupancy sensors in enclosed areas such as enclosed offices, conference and meeting rooms, storage and washrooms.
3. Provide DDC features such as the ability to turn off all non-security lighting systems and mechanical exhaust systems, and bi-level switching of lighting.

E. EQUIPMENT AND FURNISHINGS

EQUIPMENT

E010 Commercial Equipment

Maintenance and Operations: All equipment and systems shall be located and installed with adequate clearance for servicing. Establish dedicated zones for services located above suspended ceilings for HVAC, electrical, lighting, data/communication utility runs.

Office Equipment: Plug loads can be reduced to 0.8-0.9 W/sf. Options to reduce plug loads include:

1. Standard Equipment Type: For new equipment, purchase EPA Energy Star Program computers, copiers, printers, task lighting and other equipment for at least 90% of equipment types for which Energy Star options are available.
2. Monitors: 90% of computer monitors should be LCD monitors.

Mechanical engineer to calculate expected plug loads based on final owner equipment list, including existing equipment moved from other buildings, for use in energy modeling.

E020 Institutional Equipment

Not Applicable

E030 Vehicular Equipment

Not Applicable

E040 Other Equipment

Operational recycling and material handling: Provide waste management areas for the collection of recyclable materials (paper, cardboard, aluminum, glass & plastic at a minimum) and storage in each building or as required allowing these materials to be delivered by maintenance or cleaning staff to a central waste and recycling handling area.

Vertical chutes to deliver recycled material and waste will be explored to facilitate a comprehensive recycling program. Area located in the basement will be dedicated to collect materials from chutes.

FURNISHINGS

Solid wood products: Conserve by specifying resource-efficient materials and construction methods, such as engineered lumber. Specify renewable, tree-farmed species such as alder and poplar for interior components such as doors, veneers, paneling and casework. Conserve by specifying Forest Stewardship Council (FSC) certified sustainable wood products such as:

1. "Goodwood" seal (Friends of the Earth)
2. "Smart Woods" seal (Rain Forest Alliance)
3. "Green Cross" seal (Scientific Certification Systems).

Composite wood products shall be low VOC composition.

1. Panel Material (MDF): Must meet the requirements of ANSI A208.1-1994: concentration .3 PPM at a loading factor of 0.8 (ft2/ft3).
2. Particleboard decking: Shall meet the requirements of ANSI A208.1-1993: concentration 0.3 PPM at a loading factor of .13 (ft2/ft3).

Recycled content materials: toilet partitions, engineered wood trim, and recycled content casework.

All adhesives used for veneers or other applications must be urea-formaldehyde free.

Glare control systems: Provide perforated, aluminum mini-blinds, brushed aluminum finish, on all vision glazing. For daylight glazing greater than 7 feet AFF louvers may be used as needed to eliminate direct sun on work surfaces. The cutoff angle shall be adjustable from 30-60 degrees and the color shall be light tone.

E020 Movable Furnishings

Furniture System: If new furniture systems are needed, an attempt will be made to purchase systems furniture that is Green Guard certified or that meets the following requirements:

1. Total VOCs < 500µg/m^{2}xhr
2. Total Aldehydes < 0.1 ppm, 4-PC< limits of detection,
3. Formaldehyde <50µg/m^2·hr.
4. Test control 1 ACH, loading rate is 1 full workstation per 25.7 m^3

F. SPECIAL CONSTRUCTION AND DEMOLITION

SPECIAL CONSTRUCTION

F010 Special Structures

F020 Integrated Construction

Quality Assurance: The design team will partner to create and implement a Quality Assurance and Commissioning Plan for the project. Elements of the plan to be included:

1. Erosion & Sedimentation Control Plan
2. Waste management Plan
3. IEQ management Plan
4. LEED documentation submittals
5. Building Commissioning Plan (Final plan produced by the Commissioning Agent, contracted to the Owner)

F030 Special Construction Systems

Erosion & Sedimentation Control: All construction activities shall comply with the best management practices outlined in the United States Environmental Protection Agency 2003 EPA Construction General Permit (GCP). Erosion and sedimentation control devices shall be monitored on a weekly basis to ensure that the requirements of the Plan are being met. Control devices that are not functioning properly shall be repaired and repair activities shall be documented. Samples of Erosion and Sedimentation Control measures include perimeter silt fencing, temporary construction entrances, retention of topsoil and temporary seeding.

F040 Special Facilities

F050 Special Controls & Instrumentation

SELECTIVE BUILDING DEMOLITION

F010 Building Elements Demolition

F020 F2020 Hazardous Components Abatement

G. BUILDING SITEWORK

SITE PREPARATION

Reasonable Care: The construction team shall not engage in any activities that impact animal and plant species residing on properties surrounding the site. The construction team shall minimize impacts including, but not limited to noise, vibration, air pollution, surface water pollution, groundwater pollution, and soil contamination.

G010 Site Clearing

Set backs: All construction activities shall be performed inside of the construction boundary. Staging areas, construction parking, and all other construction activities shall be located within the construction boundary, or already developed portions of the site.

G020 Site Demolition & Relocations

Large beams located in Old Solley's will be removed and retained for use inside the new structure. Additional materials, such as the siding will also be set aside for possible use in public areas of the building.

All demolition will recycle the majority of waste generated. Careful consideration will be given to locate recycling opportunities in the Seward region. A total CWM Goal for demolition materials is a 75% diversion rate.

G030 Site Earthwork

Cut and fill volumes shall be balanced to the greatest extent possible when designing the substructure to reduce construction traffic, tipping fees for waste disposal and fill costs. Staging areas shall be designated on the site for storage and protection of excavated materials slated for reuse as fill. Use of basement excavation materials may be used to level the parking lot located across 4th street. Cut and fill dirt volumes shall not be included in Construction Waste Management volumes.

G040 Hazardous Waste Remediation

SITE IMPROVEMENTS

G010 Roadways

G020 Parking Lots

Carpool/vanpool parking spaces shall be designated with striping and signage indicating use by MLC staff and visitors only. The spaces shall be located in preferential parking areas with convenient access to building entrances. The number of designated carpool/vanpool spaces will be greater than or equal to 2.5% of the number of FTE employees and visitors.

G030 Pedestrian Paving

All paved walkway surfaces shall be specified with a minimum reflectance of 0.3, which is typical of light gray concrete . Asphalt will not be used.

G040 Site Development

G050 Landscaping

Specify low maintenance native species, using xeriscape principles that utilize water-efficient & drought tolerant species. Owner shall review the landscape design for maintenance concerns. The project goal is to not to install a permanent irrigation system.

SITE CIVIL

G010 Water Supply & Distribution Systems

G020 Sanitary Sewer Systems

G030 Storm Sewer Systems

Stormwater System: All stormwater runoff volumes generated on ground level surfaces shall be directed to on-site stormwater bioswales or treatment basins. Stormwater will not be allowed to leave the site via surface sheet flows into roadways or onto adjacent sites.

Treatment: The combined treatment system shall be sized and specified to remove a minimum of 80% of total suspended solids (TSS) from the stormwater runoff volumes before discharge.

G040 Heating Distribution

The project may install sidewalk radiant heating to remove snow and ice. The sidewalk slab will have embedded temperature sensors in several areas to alert the building automation system (BAS) to turn on-off radiant zones.

G050 Cooling Distribution

G060 Fuel Distribution

G070 Other Civil / Mechanical Utilities

SITE ELECTRICAL UTILITIES

G010 Electrical Distribution

G020 Exterior Lighting

Parking Area: Lighting power density not to exceed 80% for exterior areas and 50% for facades of ASHRAE/IESNA 90.1-2004 standards

1. Exterior fixtures shall be full-cutoff design. No uplights will be used.
2. Exterior parking illumination shall meet the following:

    a. Minimum horizontal illuminance: 0.2 fc

    b. Max horizontal illuminance: 4 fc

    c. Uniformity ratio (maximum to minimum): 20:1

    d. Average horizontal illuminance: 2.1 fc

    e. Average to minimum ratio: 5:1
3. All pole mounted fixtures located adjacent to the project boundary will be located such that no light spills onto adjacent roadways and sites or will be equipped with shielding that prevents light from spilling onto adjacent roadways and sites.
4. Where buildings are lit at the exterior, target illumination values shall be:

    a. Building entry – public spaces: 30 lux (3 fc)

    b. Building entry – simple orientation for short visits: 50 lux (5 fc)

c. Façade – bright surroundings, light surfaces: 50 lux (5 fc)

d. Façade – bright surroundings, dark surfaces: 100 lux (10 fc)

e. Façade – dark surroundings, light surfaces: 20 lux (2 fc)

f. Façade – dark surroundings, dark surfaces: 50 lux (5 fc)

G030 Exterior Communications & Security

G040 Other Electrical Utilities

OTHER SITE CONSTRUCTION

G010 Service Tunnels

G020 Other Site Systems & Equipment

Bicycle racks: Bicycle racks shall be installed to accommodate 5% of full-time building staff and visitors (based on FTE calculations). The racks shall be located in close proximity to an accessible entrance(s) of the building.

End of Green Basis of Design