1. DESIGN CRITERIOR AND GUIDELINE

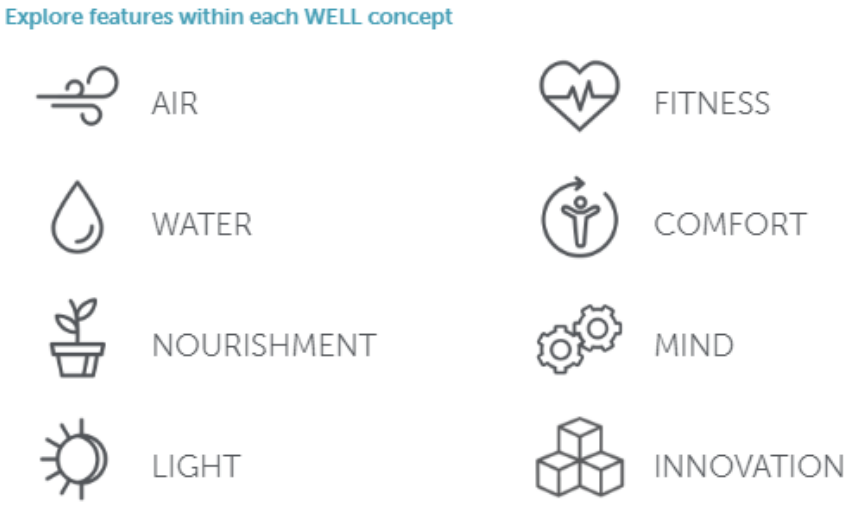
1.1 WELL DESIGN

INTRODUCTION

The PARQ has been designed with an aim to achieve "WELL" Certification for Core and Shell projects, which has an objective to improve built environment conditions for better health and well-being of occupants. WELL is developed by the International Well Building Institute (IWBI) and currently adopted in many countries.

WELL CRITERIA

WELL has a set of criteria for designing and constructing a building and its associated ground to support health and well-being of building occupants. The certification process includes a Performance Verification upon a construction completion, involving on-site inspection and air, water and noise quality sampling and testing, which will be completed by WELL assessors. Some of the collected samples will be sent to a third-party laboratory for an analysis. The Performance and Verification process may take place at the same time with tenants' fit-out. ***Therefore, tenant space design and construction including material selection and construction management should adhere to the same set of criteria to help the project succeed in the Performance Verification test.*** Additionally, tenants will also have an opportunity to earn WELL certification for their own spaces, WELL for Interiors which tailored for projects only occupying a portion of the space in a building.



WELL design and construction criteria are categorized into 8 following concepts.

1. Air quality (e.g., organic and inorganic gases, and particulates)
2. Water quality (e.g., dissolved chemicals and suspended solids)
3. Light attributes (e.g., color quality, intensity and spectral power distribution)
4. Thermal considerations (e.g., ambient and radiant temperature, air speed and humidity)
5. Acoustic elements (e.g., decibel levels and reverberation)

In each concept, there are 2 types of requirements; 1) Precondition- Mandatory, 2) Optimization- optional. One optimization is equal to 1 point. Total number of achieved optimization will be used to determine the awarded certification level.

ABOUT WELL PROJECT FEATURES

Air

The PARQ aims to provide a superior indoor air quality. Ventilation system of the building is designed in accordance to international standard, ASHRAE 62.1-2013 and the outdoor air supply rate is increased by 30% over the standard for the circumstance of unusually high occupancy. The outdoor air units are also equipped with pre-cooling and energy recovery units so both thermal comfort and energy efficiency of the building can be optimized.

All air handling units are equipped with MERV 13 filter to effectively reduce pollen, dust, mold spores, dust mites and other allergens from the indoor air. For higher-level air filtration, all air handling units have sufficient space and system sizing for future implementation of carbon filters by tenants

For interior materials selections, no asbestos and mercury-containing materials and equipment are specified. Low-emitting paints, coatings, adhesives, sealants flooring and furniture are used throughout the building interior.

Water

The project makes sure that water for human contact (restroom faucet and shower) is clear and free from coliforms, including E. coli. To promote water drinking habit, the PARQ provides drinking water dispensers in the retail common areas and office pantries. The water dispensers have a high-efficiency filtration system that can reduce organic, inorganic and agricultural chemical contaminations and public water additives such as chlorine and fluoride.

Additionally, for occupants' safety, the PARQ use only lead-free* pipes and fittings in plumbing system that contact with water for human consumption (pantry sink and drinking water dispenser)

*Note– Definition of Lead-free per the WELL requirements, complies with NSF/ANSI 61: Drinking Water System Components

Nourishment

The PARQ has planned to provide a kiosk or vending machine selling food and beverage with nutrition and artificial ingredients disclosure on the product label. The food and beverage sold by the project shall contain low sugar and non-grain flour.

To provide an access to fresh produces, food growing space and supporting equipment are arranged for tenants.

Hand hygiene for healthy eating habit is also promoted. Fragrance-free soaps and disposable hand towels are supplied in the restrooms. Sink in the restrooms and pantries are properly sized for convenient hand washing.

The project also promotes healthy diets by banning an advertisement of high sugar, non-whole grain and trans-fat containing food and beverage while educational posters, brochures or other

visual media, messaging an encouragement of the consumption of whole, natural foods and cuisines, are posted in the common areas.

Light

A human body responds to difference in natural light colors during the day. Natural light is the main drivers of the circadian system, which starts in the brain and regulates physiological rhythms throughout the body's tissues and organs, affecting hormone levels and the sleep-wake cycle. The PARQ building envelope is designed to bring in natural light into the interior spaces while external shading devices are installed to reduce excessive amount of light that causes glare.

For electric lighting, lighting fixtures with shielding are carefully selected to ensure glare is minimized at each visual angle.

Moreover, an open office floor plan and vision glass area can allow tenants to arrange their own spaces fully open to a view outside.

Fitness

The PARQ has an intention to incorporate short periods of physical activity into the workday. The presence of retail shops, bus stops and offices within walking distance from residences is linked to a higher likelihood of walking and using transit. Similarly, integrating elements of active design into the building and site, and creating pedestrian-friendly environments around the building can help incentivize physical activity. Providing facilities such as benches, drinking fountains and water bottle refilling stations along a building's walking routes can help support occupant activity throughout the day.

Moreover, fitness or training programs are offered from an expert to help occupants learn new fitness techniques and achieve physical health goals.

Comfort

To provide comfortable and convenient usage of the building, accessible design is another key concern of the PARQ. Therefore, the project adheres to ADA Standards for Accessible Design so that the building is accessible, and the building elements are well dimensioned.

Room conditions are also vital to occupants' productivity. As such, the PARQ set up a system design and operation criteria in accordance to ASHRAE 55-2013. A separate temperature control zone for each solar exposure and interior space is provided.

Noise can lead to decreased productivity, especially in an urban area where exterior noise can be loud and repetitive, and central air condition system in an office building can generate interior noise. The PARQ minimizes the problems by choosing laminated insulating glass and a well-sealed curtain wall system and specifying a noise criteria standard for the mechanical equipment.

Mind

A physical space in which design principles align with an organization's core cultural values can positively impact occupants' mood and morale. The PARQ therefore integrate aesthetically

pleasing elements into a space to help building occupants derive a measure of comfort or joy from their surroundings.

People had constant interaction with living things and their natural surroundings. Natural light is therefore introduced to the building's interior spaces, especially on the office floors. Natural material and patterns are used throughout the building.

CONSTRUCTION MANAGEMENT AND MATERIAL SELECTION TO SUPPORT THE PARQ'S WELL CERTIFICATION ACHIEVEMENT

As described earlier about WELL Performance Verification involving air sampling test, tenants are requested to support the PARQ by choosing low-emitting interior materials (low-VOC, no added formaldehyde resins, etc.) and applying clean interior construction practices (such as fume and dust control, protection of base building HVAC systems, construction area isolation, pathway interruption, etc.). Should tenants need further instructions, please contact the building management team or consult the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008–2008, Chapter 3.

PROJECT INTEGRATION WITH WELL FOR INTERIORS

As the PARQ is attempting to achieve WELL certification, some of the building features can benefit the tenant spaces in pursuing WELL for Interiors. Below is a list of WELL for Interiors requirements that the PARQ's Core and Shell project can support.

<u>Air</u>

Air Quality Standard (Precondition)

The PARQ was carefully designed and built in order to ensure good air quality is delivered to indoor spaces. Interior materials were selected in accordance to WELL requirements.

Smoking Ban (Precondition)

The PARQ is a smoking-free building.

Ventilation Effectiveness (Precondition)

Ventilation system of the building complies with ASHRAE 62.1-2013 standard

Air Filtration (Precondition)

All Air Handling Units (AHUs) have enough rack space and system sizing to accommodate carbon filters. MERV 13 filters are already installed at all AHUs. The PARQ also provide schedules maintenance to ensure the filtration system continues to operate as designed.

Microbe and Mold Control (Precondition)

As a part of the building operation and maintenance policy, all cooling coils are inspected on a quarterly basis for mold growth and cleaned if necessary.

Healthy Entrance (Precondition)

Entryway systems are installed at the retail and office entrances to capture dust and particulates from outside. The ground floor lobbies have a positive pressure to prevent outside air from infiltrating into the building.

Fundamental Material Safety (Precondition)

No asbestos was used during the Core and Shell project's construction. Not more than a weighted average of 0.25% lead in wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures, and 0.20% for solder or flux used in plumbing for water intended for human consumption (all plumbing components touching water sent to the building's pantry rooms and drinking water dispensers.

Increased Ventilation (Optimization)

The building's ventilation systems supply outdoor air 30% higher than the rates required by ASHRAE 62.1-2013.

Outdoor Air Systems (Optimization)

The Core and Shell project is equipped with dedicated outdoor air units with pre-cooled air and recovery wheels, so that optimal air quality and thermal comfort can be independently achieved.

Water

Fundamental Water Quality (Precondition)

The potable water quality can meet WELL's turbidity and total coliforms requirements.

Inorganic, Organic, Agricultural Contaminants and Public Water Additives (Precondition)

The PARQ provides drinking water dispenser equipped with high-level filtration system to remove those contaminants and additives to ensure the water will safe for drinking.

Drinking Water Promotions(Optimization)

To promote proper hydration throughout the day, drinking water dispensers installed in the retail concourse and office's pantries has a filtration system that can remove minerals and the water clear and good-tasting

Nourishment

Hand Washing (Optimization)

For hand hygiene, fragrance-free hand soap and disposable paper towels are provided in all restrooms of the project. Bathroom and kitchen sinks are designed with dimensions proper for hand washing.

Food Production (Optimization)

The PARQ offers gardening spaces and planting tools for tenants' cultivation of produce and herbs, which increases access to healthy, fresh and nutrient-rich foods.

Light

Electric Light Glare Control (Precondition)

Lighting fixtures in office tenant space, installed by the PARQ project, have shielding angles complying with the WELL requirement.

Right to Light (Optimization)

The office floor plan allows occupants to have multiple lines of sight to outdoor view.

Fitness

Structured Fitness Opportunities (Optimization)
The PARQ has a scheduled fitness and training program offered to tenants.

Exterior Active Design (Optimization)
The project provides landscape furniture and features for encouraging occupants to spend time outside the building or have an outdoor exercise.

Comfort

Assessible Design (Precondition)

The PARQ's interior and exterior, from the site entrance to the building entries, common corridors, restrooms and all public areas, are designed to meet ADA Standards for Accessible Design.

Olfactory Comfort (Optimization)

All restrooms, janitorial closets, kitchens and pantries have negative pressurization to limit unpleasant odors. This can greatly contribute to occupant comfort and well-being.

Mind

Health and Wellness Awareness (Precondition)

This tenant guideline is a start point to tenant's health and wellness awareness. Tenants can study this guide to understand WELL features of the PARQ and associated benefits. Ultimately, this might inspire tenants to designed and built out their spaces in accordance to WELL requirements. This guide is also a good example if tenants wish to develop a WELL guideline for their own areas.

Beauty and Design (Precondition)

Integrating aesthetically pleasing elements into a space can help building occupants derive a measure of comfort or joy from their surroundings. Interior and exterior of the PARQ are therefore designed with an aim to create delightful human perceptions and to celebrate local culture, spirit and place. The incorporation of design elements and artwork to the spaces can create a calming environment able to improve occupant mood.

Biophilia (Precondition)

The PARQ project has tried to incorporate nature into the building through a provision of natural light and space layout that open to outside and landscape area. Natural materials and natural patterns are used for the building interior to allow a touch of nature.

1.2 GREEN DESIGN

PART 1: GREEN CONCEPT GUIDELINE

INTRODUCTION

THE PARQ has been designed to be a certified "green" development. The project meets stringent environmental requirements specified in the LEED (Leadership in Energy and Environmental Design) Core & Shell (CS) Rating System developed by the United States Green Building Council (USGBC). In reviewing this document, APPENDIX A at the end of these guidelines provides information of some helpful industry-standard terms, and APPENDIX B lists resources worth investigating in terms of expanding your understanding of green building practices, impacts and costs.

ABOUT GREEN CONCEPT

Currently, people spend over 90% of their time in buildings with much of that time is spent at work. Buildings are responsible for 80% of total electricity and over 30% of total energy used annually. Buildings also account for significant portions of fresh water consumption during both construction and occupancy. Material waste during construction accounts for up to 50% of landfill, depending on location. A well-designed, sustainable building works to reduce impact on the environment while garnering financial and health-related benefits for the building occupants.

One benefit to the tenants includes the comfortable, controllable environment designed into sustainable buildings. The impact of such an attribute can be manifested in increased employee retention. "Green", or sustainably designed, buildings not only reduce consumption of energy, fresh water and materials, but also provide economic benefits in the form of Return on Investment (ROI), in addition to reduced energy and other utility bills.

OUR SUSTAINABLE PROJECT FEATURES

With the above factors in mind, the project team carefully designed and constructed this Grade "A" Office Building with very specific energy-saving and eco-friendly features. Here is a quick look at some of the specific LEED design approaches from which you will benefit as a tenant:

Parking:
Preferred parking spaces have been provided for green vehicles. Electric car chargers are allocated in the basement to support the use of environmental-friendly vehicles.

Bicycle Storage and Shower Facilities:
The PARQ has bicycle storage and shower facilities available for tenant. By providing these facilities, the developer wishes to encourage alternate methods of transportation, further promoting less air pollution created by vehicular traffic.

Water Use Reduction:
Normally, fresh water supply is used to support residential, commercial and recreational activities, and then discharged back into bodies of water after use or treatment. We are reducing fresh water use through a number of means, including use of water saving fixtures and water efficient landscaping. Through careful selection of the installed water fixtures, the development can reduce water use in all indoor water fixtures by 40% from general office standard. For landscaping irrigation, low-water consumption plants are selected to reduce landscaping water demand.

Optimized Energy Performance, Lighting Controls:
Lighting in all common areas and exterior lighting is controlled by a central lighting control system. The lighting is programmed to automatically come on and go off based on time-of-day settings. For tenant spaces, luminaires at the building perimeters are equipped with daylight sensors connected to the light bulbs to adjust lighting level when natural light is sufficient. The lighting control system is capable of accepting tenant circuits as necessary to meet minimum energy efficiency requirements.

Optimized Energy Performance, HVAC:
The high efficiency HVAC equipment installed offers cost effective energy savings, and exceeding ASHRAE 90.1-2010 minimum efficiency requirements. To help achieve these high energy scores, the building has been designed with a high efficient insulating glazing system, a high efficient chilled water system and a variable air volume system, to name a few of the features provided.

Note: ASHRAE – American Society of Heating, Refrigerating, and Air-conditioning Engineers

Ventilation and Outdoor Air Delivery:
The ventilation system was designed to exceed projected ventilation levels based on anticipated future tenant requirements. The system has been designed with 30% increased outside air ventilation over ASHRAE 62.1-2010 standard, to help further a health interior working environment.

Indoor Chemical and Pollutant Source Control:
Low-emitting materials were used in the building's construction, significantly reducing the quantity of air contaminants that are odorous, irritating and/or harmful to the comfort of tenants. This included adhesives and sealants; paints and coatings; flooring; insulation and; composite wood. Facility cleaning and maintenance areas have been equipped with isolated exhaust systems to prevent air contaminants.

Views:
The office tenant spaces were designed with the knowledge that working environment studies show employees are more productive when given access to high-levels of day lighting and views. The building has been thoughtfully designed to capture views and provide ample day lighting on each floor.

Commissioning:
The Owner retained a third-party independent commissioning authority to commission the energy-related systems within the building's Core and Shell spaces. The Commissioning process helps to assure the building Owners that the project is functioning optimally at the time of initial occupancy and beyond.

Environmental Tobacco Smoke:
The building has also been established as a non-smoking facility, consistent with the desires of the owner and tenants to promote good health to their clients and the community at large. A designated outdoor smoking has been allocated 7.5 meters away from the building entrances, openings, air intakes and outdoor recreational areas.

Recycling:
An on-site recyclable storage and sorting facility has been provided to further promote a reduction of materials being sent to the landfill. In addition to post-construction recycling efforts, the developer implemented recycling and regional material purchasing practices during construction to help divert as much construction waste as possible, as well as reduce the environmental impact of material manufacturing and delivery to the site by ensure as much of the materials are bought locally or regionally were possible.

Project integration with a LEED-CI (Commercial Interiors) project
Because this project is a LEED CS (Core & Shell) project, there are specific benefits for projects who desire to pursue a LEED-CI (Commercial Interiors) certification for their spaces. Below are items that specifically benefit a LEED-CI certification from the core/shell project certification:

Integrative Process (2 points)
Site selection is a key to the successful LEED-CI process. Locating in a LEED Core and Shell building benefit a project in achieving many LEED-CI credits.

Location and Transportation

Surrounding Density and Diverse Use (8 points)
The PARQ is located in Bangkok's central area and surrounded by more than 8 diverse basic services.

Access to Quality Transit (7 points)
The PARQ is within 1/2 mile and 1/4walking distances to MRT and 2 bus stops respectively.

Water Efficiency

Indoor Water Use Reduction (8 points)
LEED-CI projects must consider all water fixtures that support the needs of the occupants. The PARQ's water fixtures which achieve 40% indoor water use reduction, can therefore help tenant spaces to earn points in this LEED credit.

Energy and Atmosphere

Fundamental Commissioning of Building Energy Systems (Mandatory)
Enhanced Commissioning (4 points)
LEED-CI projects are responsible for completing commissioning process for all systems and equipment included in their scope, including items furnished by the base building, but modified or relocated as part of tenant fit-out. The core/shell project has already had fundamental commissioning completed so this would be the basis to ensure the tenant space meets these requirements also, allowing for ease of tenant commissioning.

Minimum Energy Performance (Mandatory)
Optimize Energy Performance (25 points)
Building envelope, lighting system and HVAC equipment of the core/shell project meets ASHRAE 90.1-2010 standard and achieve the minimum energy saving percentage. Tenants' spaces can therefore easily comply with this requirement.

Fundamental Refrigerant Management (Mandatory)
Enhanced Refrigerant Management (1 point)

The PARQ meets the requirements of zero use of chlorofluorocarbon (CFC)-base refrigerants. The chiller plants supplying chilled water to air handling units serving tenants' spaces, have low refrigerant charges.

Materials and Resources

Storage and Collection of Recyclables (Mandatory)

The PARQ has provided an on-site recyclable storage and collection area, allowing for ease of tenant compliance.

Indoor Environmental Quality

Minimum Indoor Air Quality Performance (Mandatory)

Ventilation rates designed for The PARQ meet ASHRAE 62.1-2010 standard.

Environmental Tobacco Smoke Control (Mandatory)

The PARQ has been designated as a non-smoking building. LEED-complying outdoor smoking area is also provided on the ground floor.

Enhanced Indoor Air Quality Strategies (2 points)

The PARQ has entryway systems to capture dust and particulates. All chemical containing rooms in the core/shell areas have dedicated exhaust fans to prevent cross-contamination. Filtration systems at the outdoor air units are rated MERV13. Additionally, ventilation rated provided is 30% above ASHRAE 62.1-2010 standard.

Quality views (1 point)

The PARQ was designed with this credit in mind and a typical tenant layout should be able to easily achieve this point given the amount and layout of the perimeter glazing.

The above items are mandatory and credit requirements that can be achieved for a LEED-CI project based on the installations of the LEED CS project. Many other LEED-CI credits are achievable through careful design and construction of the tenant space (i.e. low-emitting materials, materials with responsible raw material sourcing, construction waste management and construction indoor air quality management, etc.).

Completed review of the LEED-CI (Commercial Interiors) Reference Guide, and coordination with the specific tenant design and selections should be performed by the tenant LEED project administrator to ensure compliance. Information regarding the LEED-CI requirements can be found online at the USGBC website – http://www.usgbc.org.

PART 2: Minimum Green Building Requirements

Partnering to provide a healthier, more productive working environment

As a tenant of The PARQ, there are a number of ways you can participate in further enhancing the efficiency and effectiveness of the facility. Making the development a great place to work depends on all of us. In addition to the recommended design practices noted herein, the developer has decided to establish the following minimum tenant build-out requirements:

Development Recycling Program:

All building occupants are encouraged to participate in on-site recycling program. The building complex includes space and a program for managing recycled materials such as paper, corrugated cardboard, glass, plastics and metals. Tenant fit-outs should include spaces (i.e. in copy rooms and pantries) designated for short-term storage and sorting of recycled items. Individual workspaces should be equipped with containers for small amounts of used copy paper, plastics and aluminum.

Lighting:

Energy Saving rated lighting should be used for 75% of all permanent fixtures within each tenant's space. Each tenant space should connect to the building's lighting control system to further energy efficiency and lighting control. Each individual office space or other single use area should be equipped with an occupancy sensor to further the lighting control requirements.

Fresh Water Usage:

The "core" restrooms in the building are equipped with efficient plumbing fixtures. Tenants who add private restrooms and other plumbing fixtures should consider continuing this effort by selecting low-flow faucets with automatic cut-off sensors, dual flush toilets, and low water consumption urinals.

Walls and Partitions:

All permanent gypsum wallboard partitions should be constructed utilizing a minimum of Post-Consumer Recycled Content drywall on metal studs only. Locally manufactured products should be used also.

Environmentally Preferable Products:

- All paints and coatings wet-applied on site should meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011.
- All adhesives and sealants wet-applied on site should meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications, as analyzed by the methods specified in Rule 1168.
- All composite wood should contain no added formaldehyde resins.
- All floorings and insulation should be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.1–2010.

Clean Construction Practices

It is highly recommended for tenants to take construction indoor air quality management procedure in accordance to the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd

edition, 2007, ANSI/SMACNA 008–2008, Chapter 3. This will help maintaining a healthy air quality within the tenant space by reducing dust and particulate accumulation, mold growth, odor and allergy caused by volatile organic compounds (VOCs).

Connecting to the Development's Sustainable Features

As noted, THE PARQ is certified "green" through the LEED rating system of the USGBC, the authority on sustainable design and green building. As you fit-out the space you will occupy in the office building, here are some additional guidelines and suggestions of ways you can further enhance the project's sustainability:

Materials:

Use local materials, including materials manufactured locally, and preferably those made with primary materials that are sourced locally.

Use durable materials to save money and time for frequent replacement or cleaning (i.e. hard commercial rubber or linoleum have longer service life than vinyl or carpet as well as fewer indoor air quality concerns).

Specify materials (such as gypsum board and carpet) with recycled content, preferably post-consumer.

Specify resilient or hard-surface floor coverings, such as linoleum, rubber or tile, that don't trap contaminants or dust and/or contain a minimum of 25% Post-Consumer Waste recycled content.

Select materials that are safe to handle (i.e. no hazardous metals, fibers or caustic chemicals) and use methods that minimize release of volatiles and trapped dust.

Select materials that can be salvaged and reused, or at least recycled, at the end of their service life.

Select Acoustic Ceiling Tiles with a minimum of 10% Post-Consumer Recycled Content.

Select wood products originating from certified well-managed, sustainable forests and/or sources.

Where practical, specify products made from raw materials that renew themselves within a 10-year cycle or better (ex: bamboo, cork, cotton, wool, etc.).

Design with precut panel sizes (modular sizing) or engineered construction products to minimize waste.

Electrical and Lighting:

Use light paint and wall covering colors to enhance effects of daylight.

Shade windows during off hours.

Incorporate lighting controls to enhance comfort and productivity.

Use the energy-saving versions of office equipment and appliances. The US Department of Energy has developed a program "Energy Star" which labels computer monitors, office equipment and appliances; see http://www.energystar.gov/whybetter.html
Select light fixtures for significant reductions in energy consumption.

Design with low-energy density and reduced glare in mind. (Glare is often a function of too much light; fewer fixtures mean lower capital cost. Indirect lighting also reduces glare.) Recommended density for lighting is 6.3 watts per square meter. Utilize occupancy sensors in areas with intermittent use such as corridor, breakroom and conference room.

Supplies:

Use recycled paper products for office and break room areas.

Use recycled plastic bags for break room area wastebaskets.

Construction Management:

Have your contractor develop a Construction Management Plan to minimize dispersal of dust and other pollutants as a result of their construction activities as previously mentioned in the Clean Construction Practices section. This plan should include protect of the existing and operating HVAC equipment.

Request that your contractor develop a plan to further the recycling efforts of the project by diverting as much construction waste and debris as possible through recycling methods.

Additional Recommendations:

Hire a professional designer and/or green building consultant with experience in sustainable office design and/or one that is accredited through US Green Building Council's LEED program (a LEED Accredited Professional).

Consider participation in the LEED Commercial Interiors program early in the Design or Pre-Design phase to capitalize on resources and strategies for integrated design approaches. More information can be found on USGBC's website – http://www.usgbc.org.

PART 3: LEED for Commercial Interiors: a Resource for Tenant Fit-Out

The USGBC has a program suited for tenants in this building called LEED for Commercial Interiors (CI). The LEED-CI rating system identifies performance standards that tenants may follow to certify their project with the USGBC. The LEED-CI system provides guidelines with the intent of assisting the Tenant and their design team in creating environmentally sound, efficient, healthy, affordable interior spaces and supportive environments for a productive workplace.

LEED-CI, addresses Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources and Indoor Environmental Quality. Tenants who select a building that is certified under the LEED for Core & Shell system, such as this one, are off to a great start due to the credits gained under the Sustainable Sites category of the LEED-CI Rating system. Note that the approaches described in Part 1 will contribute to LEED CI credits if applicable criterion of the related credit is followed.

To participate in the USGBC's LEED-CI program, a tenant should first register their tenant improvement project with the USGBC via their website (www.usgbc.org). To gain a solid understanding of the process and requirements, consider attending a LEED-CI workshop. These workshops are listed online at the above website and can be attended by any interested party.

After committing to the process the project team will begin designing and collecting project data, performing calculations and documenting compliance with LEED credit requirements. The recommendations listed in these guidelines can contribute to a tenant's LEED-CI project certification. The USGBC's website – http://www.usgbc.org – will provide more detailed and current criteria. Generally, an architect and/or green building consultant can assist you through this process on a consultant basis.

APPENDIX A
Definitions and Terminology

A
Absorption - Process by which one substance is drawn into the structure of another substance
Antimicrobial - An agent that destroys microbes such as bacteria and fungi

B
Bake-out - Process of heating a building space in an attempt to accelerate VOC emissions
Benefit/Cost Analysis - Economic assessment of benefits and costs of a material of process, usually in relation to health-based alternatives
Bioaccumulants - Substances that increase in concentration in living organisms Biodegradable - Waste material that can be decomposed by bacteria or fungi
BOMA - Building Owners and Managers Association; they issue guidelines for measurement of lease areas
By-product - Material generated as a consequence of producing the principal product
Building Envelope - Exterior surface (including walls, windows and roof) or "shell", of a building
Building-related Illness - Illness whose cause and symptoms can be diagnosed and attributed to a specific pollutant source within a building

C
Carbon Dioxide - Odorless gas typically created by respiration; often used to measure ventilation adequacy of a space
Carbon Monoxide - Colorless, odorless, toxic gas; typically created during combustion
Carcinogen - A substance capable of causing cancer
CFCs (Chlorofluorocarbons) - Chemical compounds, used primarily in cooling of refrigerators and air conditioners that have been found to deplete the stratospheric ozone layer
CFM (Cubic Feet per Minute) - A common measure of airflow
Closed-loop Recycling - A recycling system whereby a material is remade into a similar product
Commissioning - Process of testing and adjusting operating systems prior to occupancy
Contaminant - A substance (physical, biological, chemical or radiological) that has an adverse effect on soil, air and/or water

D
Dioxin - A persistent toxic chemical group and carcinogen. Dioxin production is an accidental byproduct of PVC (vinyl) manufacture due to the use of chlorine

E
Embodied Energy - The total amount of energy used in procurement, production, construction and transportation of a material.
Emissions - Release of liquids, solids or gases from a process or material

F
Flush-out - Process in which a large amount of fresh air is introduced in an effort to "flush" or remove emissions from the air
Formaldehyde - A carcinogenic, colorless, poisonous and flammable gas with strong odor
Fungus - A group of organisms such as mildew, mold, yeast and mushrooms that lack chlorophyll.

G

Green Design - A term indicating use of environmental principals in design, i.e. efficient energy and material use
Greenwash - Disinformation, often in the form of marketing, which falsely indicates or implies environmental responsibility

I
IAQ (Indoor Air Quality) - The level of contamination of air by harmful or discomforting elements

L
Landfill - Disposal site for wastes
LCA (Life Cycle Analysis) - The evolution of the environmental cost (i.e. energy use and/or waste) of a product, from extraction of raw material through final disposal
LEED – Leadership in Energy and Environment Design, the premiere sustainable rating system

M
Microbial Growth - Multiplication of microorganisms such as fungi and bacteria
Micron - One millionth of one meter

O
OSHA - Occupational Safety and Health Administration

P
Particulate - Very fine particles or dust
Post-consumer Material - A product containing material that has been reclaimed after use
Post-industrial Material - A product containing scraps and/or waste from a manufacturing process
PPM - Parts per million
PVC (Polyvinyl Chloride) - A plastic used for rigid and elastic products such as bottles, credit cards, window frames, pipes, flooring, wallpaper, medical products and toys. Vinyl production and degradation, such as burning, results in the release of dioxin, a toxin.

R
Recycling - Process of collecting and processing materials that would have been waste and reusing them Renewable Resources - Materials or energy that can be replenished at the same rate or faster than it takes to deplete, or use

S
Sick Building Syndrome - Non-specific illness or discomfort that appears to be linked to time spent in a building or space
Sustainability - Continued viability. Quality of integrating practices that meet present needs without compromising the ability of future generations to meet their needs.

T
Task Lighting - Light that is specific to a limited area or activity (as opposed to general lighting)
Tipping Fee - Charge for unloading or dumping waste at a landfill or recycling facility
Toxic - Deadly, harmful or poisonous

U
Urea-formaldehyde - A synthetic, thermosetting resin with condensed urea and formaldehyde that is used to make plywood, particle board and laminated wood products

USGBC – U.S. Green Building Council, author and administrator of the LEED rating systems, more information at http://www.usgbc.org

V
Volatile Organic Compound - Organic compounds (substances characterized principally as carbon, hydrogen or nitrogen) collected in air, usually measured in milligrams per cubic meter

APPENDIX B
Information Resources
USGBC, LEED program author and administrator
http://www.usgbc.org

DOE (Department of Energy) - lighting, daylighting, appliances and more,
http://www.eere.energy.gov

Environmental Building News, GreenSpec Directory & Green Building Advisor by Building Green, Inc.,
http://www.buildinggreen.com

Environ Design publications and conferences by Interiors & Sources Magazine,
http://www.isdesignet.com

Green Seal, Inc. Choose Green Reports,
http://www.greenseal.org

Green-e, Program for electricity from renewable sources,
http://www.green-e.org

Greener Buildings, by GreenBiz.com and the USGBC,
http://www.greenerbuildings.com

Environmental Design + Construction Magazine,
http://www.edcmag.com